PB-230 479

POLLUTION OF LAKE MICHIGAN AND ITS TRIBUTARY BASIN. PROCEEDINGS OF CONFERENCE HELD AT CHICAGO, ILLINOIS ON JANUARY 31, FEBRUARY 1-2, FEBRUARY 5-7, 1968. EXECUTIVE SESSION, MARCH 7, 8 AND 12, 1968. VOLUME III

Federal Water Pollution Control Administration
Washington, D. C.

March 1968

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Volume 3

ILLINOIS
INDIAN
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Chicago, Illinois
Jan. 31, Feb. 1-2, Feb. 5-7, 1968
Executive Session
March 7, 8 and 12, 1968

CONFERENCE

Pollution of Lake Michigan and its tributary basin

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U. S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

417

FRIDAY, FEBRUARY 2, 1968

MORNING SESSION

(9:30 a.m.)

MR. STEIN: The conference will reconvene.

Mr. Klassen.

ILLINOIS PRESENTATION

MR. KLASSEN: Mr. Chairman, just a very brief description of the Illinois pattern for presentation.

It will be led off with a Sanitary Water Board statement, and this statement then will be followed by the statements of water users, water supply, the bathing beaches and this type of user, then the major organizations on the lake involved in waste treatment, such as the Metropolitan Sanitary District of Chicago, North Shore Sanitary District, then this will be followed by a number of short presentations, some of which will be merely read by title for the record, others that will be read by the person.

I do want to say to all of the prospective participants for the Illinois

ILLINOIS PRESENTATION (CONTINUED)

Presentation, in the interest of time and an obligation and a commitment that we have with the Chairman, please be brief, to the point, and I have an obligation to the rest of the conferees and the audience to see that the presentations that are made are pertinent to the cause here.

Without any reflection on any past experience--I mean this--there has been a lot of talk, some of which is necessary, some maybe not necessary. It might be a personal opinion, but I think we are down to the point where from now on all the presentations, and certainly from Illinois standpoint, are going to be right to the point and on the issue that we are here for, why we are here, that is, conditions on an action program so far as Lake Michigan is concerned. And I hope that some of the participants, if there are any in this category in Illinois, won't feel hurt if they are called or not called on because their presentation is not pertinent to what we are here for. This is going to be a policy that I am going to follow in the interest of time. And we are getting down to the point where we have got to make sure that the job is going to be done.

With that brief introduction, the Illinois Sanitary Water Board is the official water pollution control agency in Illinois. It is composed of directors of the Departments of Health, Conservation, Public Works, and Agriculture, a fifth member to represent the municipalities. And I want to amplify the introduction just a little of Dr. Boruff on my right which the Chairman gave yesterday.

Dr. Boruff is the industrial representative, and has been for over 10 years, on the Sanitary Water Board. In addition to that he was a member of the President's Advisory Board on Water Pollution.

The Sanitary Water Board presentation is going to be given by Douglas Morton, Chief of our Bureau of Stream Pollution Control.

Mr. Morton.

STATEMENT OF ILLINOIS SANITARY WATER BOARD
BY C. W. KLASSEN, TECHNICAL SECRETARY
GIVEN BY
DOUGLAS MORTON, CHIEF
BUREAU OF STREAM POLLUTION CONTROL

MR. MORTON: My name is Morton, Chief of the Bureau of Stream Pollution Control, State of Illinois.

Chicago and Northeastern Illinois owes its prosperity and greatness to the bounties of Lake Michigan. From its early days water from Lake Michigan was an essential commodity. As pollution and contamination pushed farther into the lake, water intakes were extended. Finally a bold new concept was developed.

In 1889 the State Legislature authorized the formation of the Chicago Sanitary District which completed construction of the Chicago Sanitary and Ship Canal January 2, 1900. Since that time relatively little pollution or contamination has reached Lake Michigan from shore installations or sewers in the Chicago area tributary to Lake Michigan. There are and will be for some time occasional intense rainfall resulting in short periods of reversed flow into the lake. These flows may occur in the North Shore Channel at Wilmette, at the entrance to the Chicago River and in the Calumet River.

Plans proposed and being developed in accordance with the Water Quality Standards required by the Federal Water Quality Act of 1965 and Illinois 1967 legislation contained in HB 1177 and SB 1794 will improve conditions in the Chicago River and Calumet River systems. When completed, even the infrequent reversals of flow to Lake Michigan will not constitute serious pollution. One industry having direct discharge to Lake Michigan is under directive to provide adequate treatment of all cooling water discharges by December 1968.

Action has been taken by the City of Chicago to require control of harbor pollution from all surface vessels and shore marine facilities by May 1968. The Metropolitan Sanitary District has installed facilities for disinfecting effluents at the north side plant and the 95th Street pumping station and has chlorination and additional facilities under construction at the Calumet and the southwest treatment works. The placing of O'Brien Locks in operation on the Calumet River has virtually eliminated flow from the Calumet River into Lake Michigan. However, all industry along the Calumet River system are under directive to have adequate improved treatment facilities by December 1968.

While much improvement to water quality of Chicago area waterways is needed, there is very little contamination of Lake Michigan from shore facilities within the Metropolitan Sanitary District of Greater Chicago.

The North Shore Sanitary District was organized in 1914 under authority of the legislation passed by the Illinois Legislature. The District now serves all the municipalities in Lake County, Illinois, which are on the Lake Michigan watershed. This area extends from the Wisconsin boundary line to the Cook-Lake County line, the north limits of Chicago Sanitary District south of Highland Park.

DOUGLAS MORTON

Between 1922 and 1928 sewage treatment facilities were constructed to serve the sewered areas in Zion, North Chicago, Lake Bluff, Lake Forest, Highwood and portions of Waukegan and Highland Park. The latest expansion and improvement program was completed in 1961. Secondary treatment and chlorination of effluents is provided at Waukegan and North Chicago serving approximately 90,000 population. Five small primary treatment plants serve the smaller communities. These vary in size from 2,500 to 10,000 persons, and serve a total population of 30,000 people. Effluents from these treatment works are chlorinated.

The character of the waste load and the volume of treated effluent in relation to dilution water available and the natural assimilative capacity of these waters indicated that the quality and degree of treatment provided was adequate and necessary approvals were issued by the Illinois Sanitary Water Board. The development of water quality standards for Lake Michigan as a result of the Indiana-Illinois Pollution Conference of March 1965 and as required under the Federal Water Quality Act of 1965 now calls for more extensive waste treatment.

The Lake Michigan Water Quality Standards specify secondary treatment for all North Shore Sanitary District plants by July 1972 and nutrient reduction as soon as practicable or by July 1977, or the removal of effluents from Lake Michigan. The Consulting Engineering study of 1963 and subsequent reports included feasibility studies and recommendations for the complete diversion to treatment plant effluents from Lake Michigan. Action decisions in regard to diversion were delayed by the Lake Michigan Diversion case before the U. S. Supreme Court. A decision by Judge Albert B. Maris, Special Master, reviewing the case was reached in October 1966 and subsequently accepted by all States participating in the case. This decision authorized the continued diversion of Lake Michigan water by the State of Illinois at existing diversion levels. The North Shore Sanitary District is currently awaiting final decision by the State authorities on its request regarding actual allocation of diversion from Lake Michigan.

The North Shore Sanitary District has advanced plans for implementing this diversion plan. Added urgency results from Illinois legislation signed into law October 30, 1967, specifying abatement of pollution to Lake Michigan by December 1968. The North Shore Sanitary District has been requested to assign priority construction to facilities needed to divert all flow from the existing primary treatment plants away from Lake Michigan. The magnitude of the total North Shore Sanitary District project and the time needed to complete designs, contracts and construction lead to the schedule for completion date of July 1972, which is contained in the Water Quality Standards for Lake Michigan. A bond issue referendum has been scheduled for mid-March 1968.

Prior to the Sanitary Water Board Act of 1929, most of the sewer system--this is in the sanitary sewer district--constructed was a combined system carrying sewage and storm drainage. The Sanitary Water Board has prohibited further construction of combined sewers. The North Shore Sanitary District plan provides for interception and treatment of all sewer flow. Upon completion by July 1972, there would be no untreated discharges into Lake Michigan. Only natural surface land runoff will reach the lake, including some treated storm flow effluent.

The industries within the North Shore Sanitary District are tributary to the sewer system and the District treatment plants. Two industries located on the lakefront have discharge now to Lake Michigan. Abbott Laboratories has secondary treatment and disinfection of the effluent. Improvements have been made in the last year to offset increased production and resultant increased waste load. Abbott Laboratories is under directive from the Illinois Sanitary Water Board to provide treatment adequate to meet the Lake Michigan Water Quality Standards by December 1968. The company has filed a time schedule and plan of action necessary to meet these requirements. Long-range planning includes participation with the North Shore

Sanitary District in diverting all effluents away from Lake Michigan. This is scheduled for completion by July 1972.

Johns Manville Company at Waukegan operates settling ponds with direct discharge of effluent which complies with the water quality standards. Outboard Marine Corporation operates oil recovery basins with effluent discharge to natural drainage tributary to Lake Michigan. These facilities will be expanded before December 1968. The Commonwealth Edison Waukegan Generating Station--this is a fossil-fueled plant--has a heated discharge to the lake which dissipates within 600 feet of the outlet.

The U. S. Steel Corporation plant at Waukegan discharges contaminated cooling water and acid water to Lake Michigan. The corporation has filed a time schedule for improvements and additions to the existing treatment facilities with final completion by November 1968. Upon completion discharge to the lake will be limited to cooling water discharge meeting the Lake Michigan Water Quality Standards.

Government agencies and corporations having direct responsibility for control or abatement of pollution have been invited to participate in this conference. Organizations and individuals with responsible interest in the protection and preservation of the waters of Lake Michigan have been invited to participate in this conference or be represented by observers. We propose to call on these groups at this time.

MR. STEIN: Thank you, Mr. Morton.

MR. MORTON: Before I conclude, I would like to state that we have included a list of municipalities and industries in the jurisdiction of the Sanitary Water Board. There is attached a map showing locations of public water supply sources and public beaches. These we would like to include as part of the record and as a part of this document we have presented.

MR. STEIN: Without objection, the charts will be included as if read and the map will appear in the appropriate place in the record with your remarks:

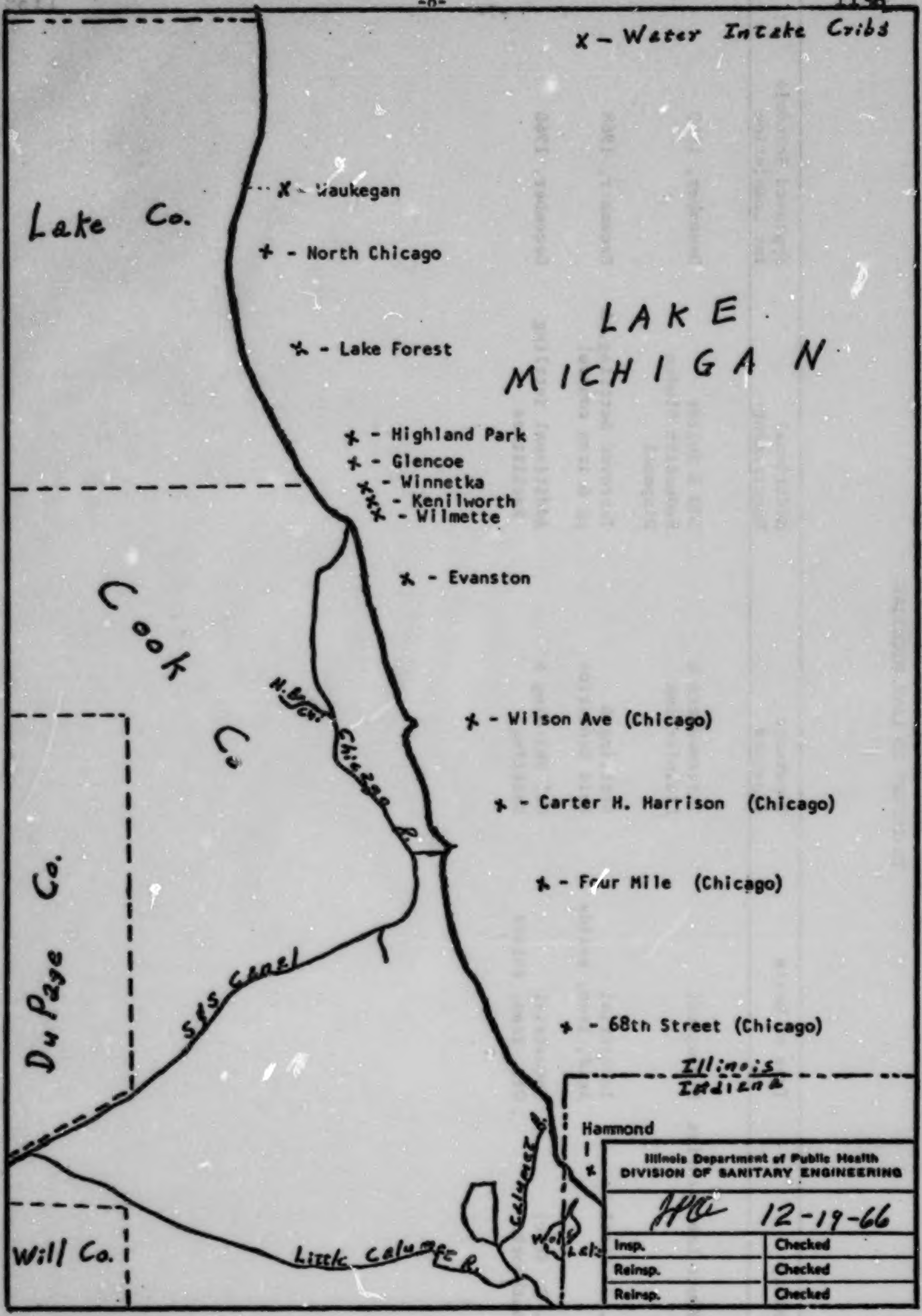
(Which said charts and map are as follows:)

STATUS OF MUNICIPAL WASTE FACILITIES
TRIBUTARY TO LAKE MICHIGAN

Municipality Sanitary District	1960 Pop.	Receiving Waters	Type Sewer System Treat. & Design P.E.	Date Built	Additional Requirements	Approved Schedule for Completion
North Shore San.Dist.		Lake Michigan	Plants and locations indented below			
Cary Ave.	7,120	Lake Michigan	Sep. & Combined Primary & Cl_2 - 6500	1931	Secondary or Removal	July, 1972
Lake Bluff	3,470	Lake Michigan	Sep. & Combined Primary & Cl_2- 1400	1922 1962	Secondary or Removal	July, 1972
Lake Forest	10,860	Lake Michigan	Sep. & Combined Primary & Cl_2 - 8000	1925 1957	Secondary or Removal	July, 1972
North Chicago	20,510	Lake Michigan	Sep. & Combined Secondary & Cl_2 - 20,000	1927	Expansion & nutrient reduction	July, 1972 July, 1977
Park Plant	5,120	Lake Michigan	Sep. & Combined Primary & Cl_2 - 6,000	1922 1961	Secondary or Removal	July, 1972
Ravine Plant	2,500	Lake Michigan	Sep. & Combined Primary & Cl_2 - 4,500	1922	Secondary or Removal	July, 1972
Waukegan Plant	65,000	Lake Michigan	Sep. & Combined Secondary & Cl_2 - 74,500	1925 1960	Storm Water Control & Nutrient reduction	July, 1977 July, 1977
Fort Sheridan		Lake Michigan	Sep. Sewer Secondary & Cl_2 - 12,500	1942	Nutrient Reduction	July, 1977
Great Lakes Naval Center		Lake Michigan	Sep. Sewer Sec. & Cl_2 - 40,000		Water Tr. Residue & Nutrient reduction	July, 1970 July, 1977
U. S. Coast Guard Station Chicago		Lake Michigan	Primary & Cl_2		Need Secondary	Dec. 1968
U. S. Naval Armory Chicago		Lake Michigan	Primary & Cl_2		Need Secondary	Dec. 1968

STATUS OF INDUSTRIAL TREATMENT FACILITIES TRIBUTARY TO LAKE MICHIGAN

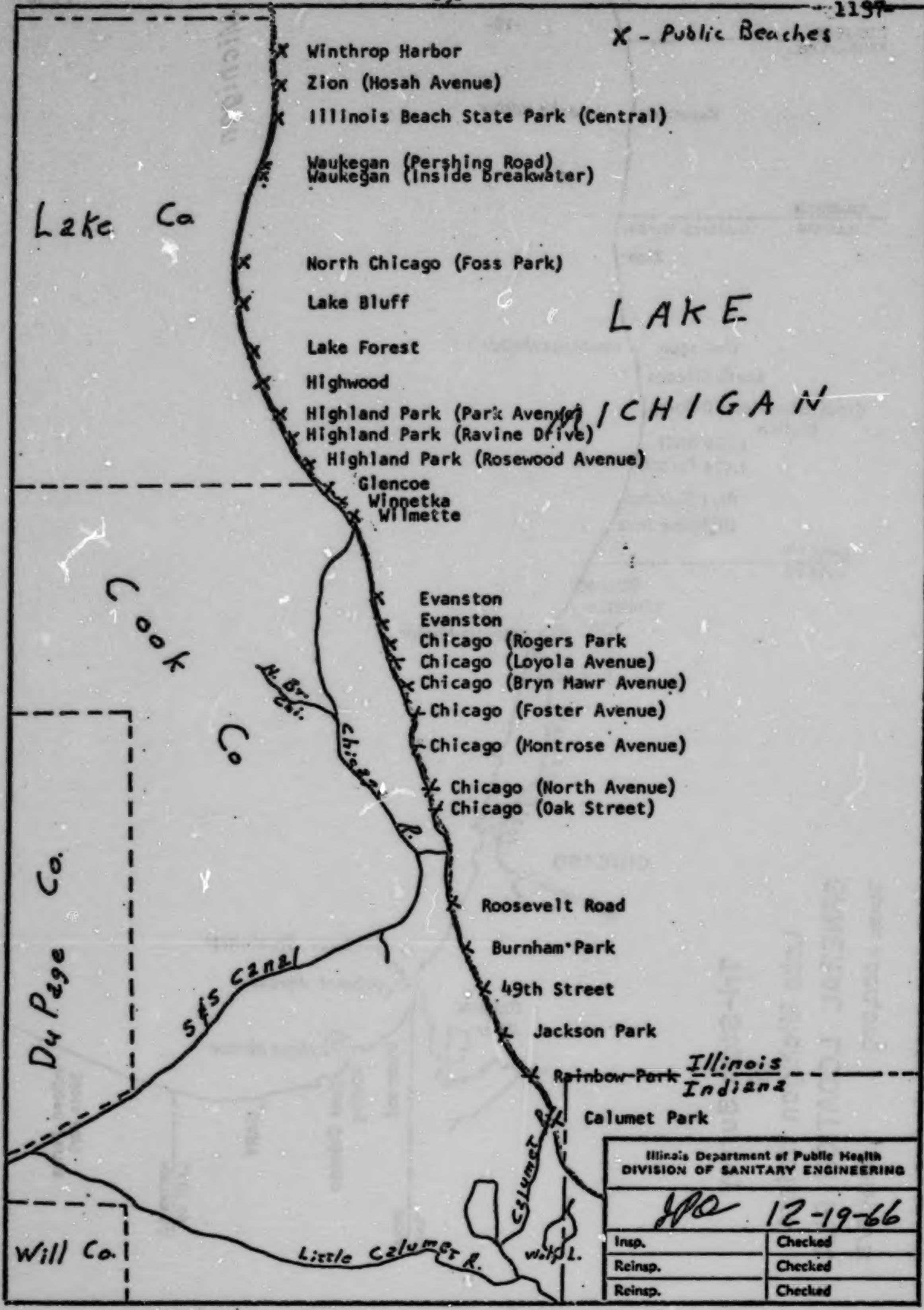
Entity	Type of Waste	Treatment Provided	Additional Requirement	Approved Schedule for Completion
Abbott Laboratories	Biological	Intermediate & Disinfection	BOD & Solids Reduction Sludge Disposal	December, 1968
U. S. Steel	Industrial - Acid, iron, solids	Settling & Acid Reduction	Improved Settling, & pH & iron control	December, 1968
U. S. Steel Southworks	Industrial Oil, iron, solids	Oil Skimming & Settling	Additional Settling Facilities	December, 1968


x – Water Intake Cribs
Lake Co.
x - Waukegan
x - North Chicago
LAKE MICHIGAN
x - Lake Forest
x - Highland Park
x - Glencoe
x - Winnetka
x - Kenilworth
x - Wilmette
x - Evanston
Cook Co.
N. Br. Chi.
Chicago R.
x - Wilson Ave (Chicago)
x - Carter H. Harrison (Chicago)
x - Four Mile (Chicago)
Du Page Co.
S & S Canal
x - 68th Street (Chicago)
Illinois
Indiana
Hammond
x
Calumet R.
Wolf Lake
Will Co.
Little Calumet R.

Illinois Department of Public Health
DIVISION OF SANITARY ENGINEERING

12-19-66

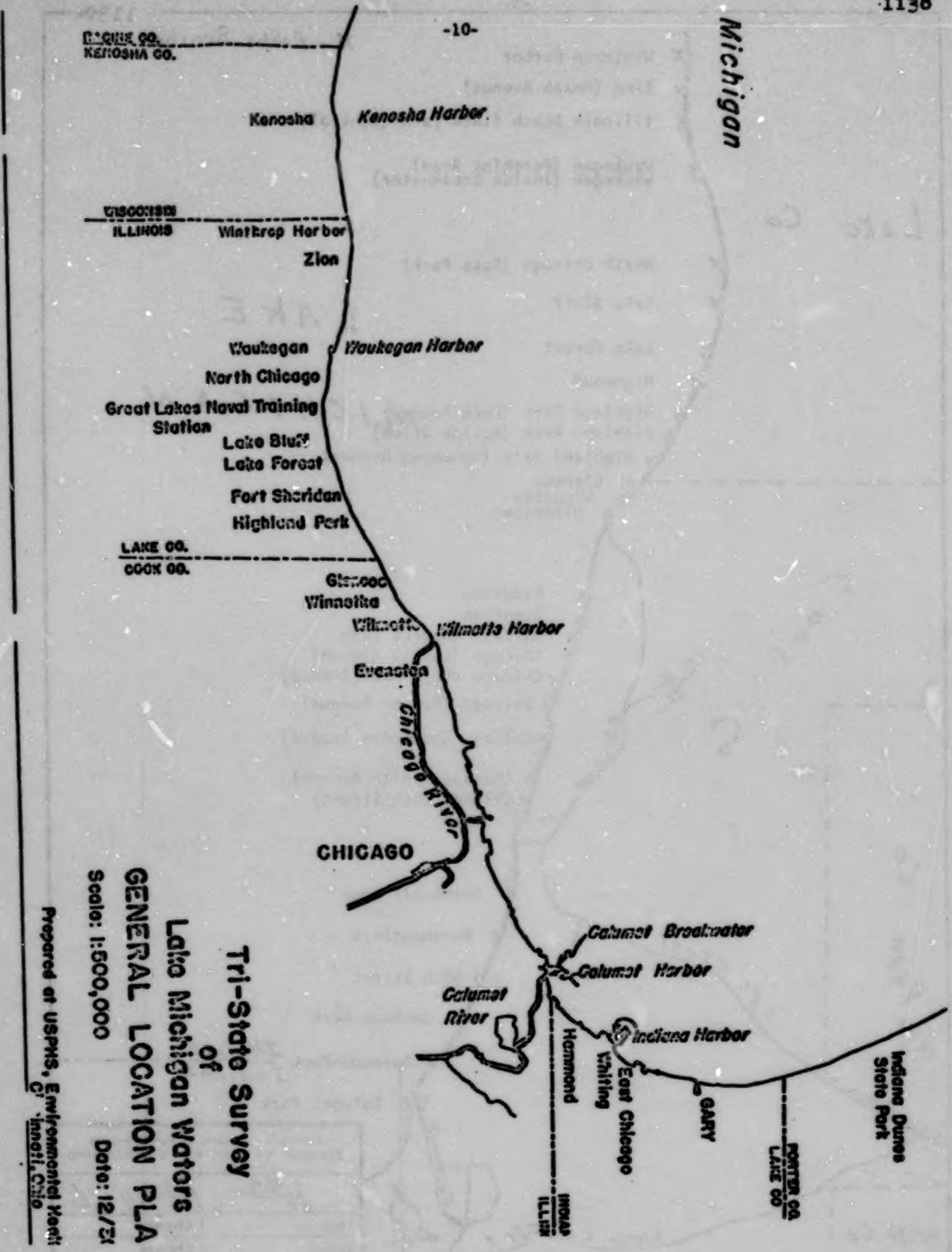
Insp.	Checked
Reinsp.	Checked
Reinsp.	Checked


X - Public Beaches
Winthrop Harbor
Zion (Hosah Avenue)
Illinois Beach State Park (Central)
Waukegan (Pershing Road)
Waukegan (Inside Breakwater)
Lake Co
North Chicago (Foss Park)
Lake Bluff
LAKE
Lake Forest
Highwood
MICHIGAN
Highland Park (Park Avenue)
Highland Park (Ravine Drive)
Highland Park (Rosewood Avenue)
Glencoe
Winnetka
Wilmette
Cook Co
Evanston
Evanston
Chicago (Rogers Park
Chicago (Loyola Avenue)
Chicago (Bryn Mawr Avenue)
N. Br. Chi.
Chicago (Foster Avenue)
Chicago R.
Chicago (Montrose Avenue)
Chicago (North Avenue)
Chicago (Oak Street)
Du Page Co.
Roosevelt Road
Burnham Park
S&S Canal
49th Street
Jackson Park
Rainbow Park
Illinois
Indiana
Calumet Park
Calumet
Wolf L.
Will Co.
Little Calumet R.

Illinois Department of Public Health
DIVISION OF SANITARY ENGINEERING

JPO 12-19-66

Insp.	Checked
Reinsp.	Checked
Reinsp.	Checked


Michigan
RACINE CO.
KENOSHA CO.
Kenosha
Kenosha Harbor
WISCONSIN
ILLINOIS
Winthrop Harbor
Zion
Waukegan
Waukegan Harbor
North Chicago
Great Lakes Naval Training Station
Lake Bluff
Lake Forest
Fort Sheridan
Highland Park
LAKE CO.
COOK CO.
Glencoe
Winnetka
Wilmette
Wilmette Harbor
Evanston
Chicago River
CHICAGO
Calumet Breakwater
Calumet Harbor
Calumet River
Indiana Harbor
Hammond
Whiting
East Chicago
GARY
PORTER CO.
LAKE CO.
Indiana Dunes State Park
INDIANA
ILLINOIS
Tri-State Survey
of
Lake Michigan Waters
GENERAL LOCATION PLA
Scale: 1:500,000
Date: 12/51
Prepared at USPHS, Environmental Healt
Cincinnati, Ohio

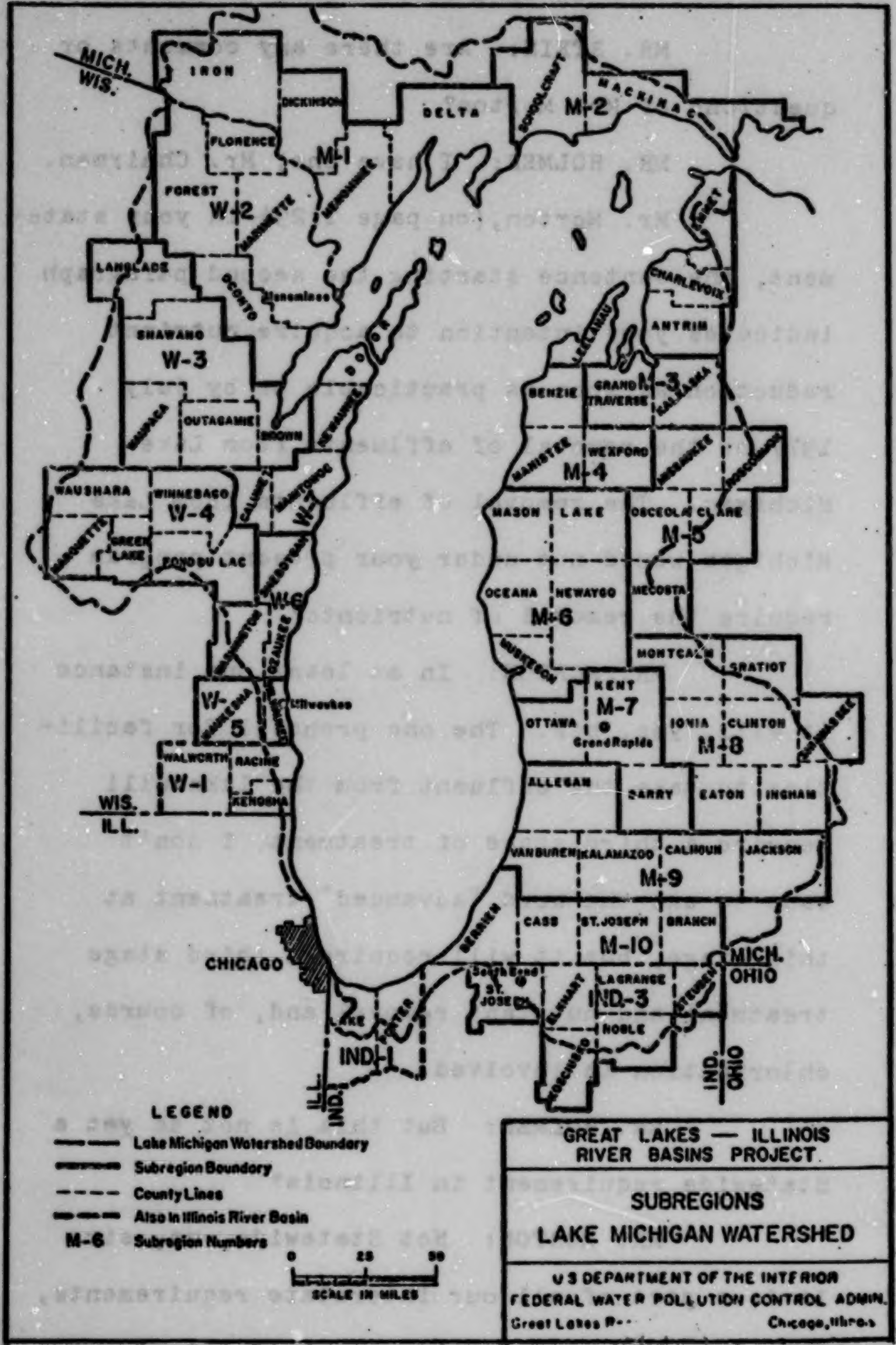

MICH.
WIS.
IRON
DICKINSON
FLORENCE
M-1
DELTA
SCHOOLCRAFT
M-2
MACKINAC
FOREST
W-2
MARINETTE
MENOMINEE
LANGLADE
OCONTO
Menominee
EMMET
CHARLEVOIX
ANTRIM
LEELANAU
SHAWANO
W-3
DOOR
BENZIE
GRAND TRAVERSE
M-3
KALKASKA
WAUPACA
OUTAGAMIE
BROWN
KEWAUNEE
MANISTEE
WEXFORD
M-4
MISSAUKEE
ROSCOMMON
WAUSHARA
WINNEBAGO
W-4
CALUMET
MANITOWOC
W-7
MASON
LAKE
OSCEOLA
CLARE
M-5
MARQUETTE
GREEN LAKE
FOND DU LAC
SHEBOYGAN
OCEANA
NEWAYGO
MECOSTA
M-6
W-6
WASHINGTON
OZAUKEE
MUSKEGON
MONTCALM
GRATIOT
W-5
WAUKESHA
MILWAUKEE
Milwaukee
KENT
M-7
Grand Rapids
OTTAWA
IONIA
CLINTON
M-8
SHIAWASSEE
WALWORTH
RACINE
W-1
KENOSHA
ALLEGAN
BARRY
EATON
INGHAM
WIS.
ILL.
VAN BUREN
KALAMAZOO
CALHOUN
JACKSON
M-9
BERRIEN
CASS
ST. JOSEPH
BRANCH
M-10
CHICAGO
MICH.
OHIO
South Bend
ST. JOSEPH
ELKHART
LAGRANGE
IND.-3
STEUBEN
NOBLE
2
LAKE
PORTER
IND.-1
KOSCIUSKO
ILL.
IND.
IND.
OHIO
LEGEND
Lake Michigan Watershed Boundary
Subregion Boundary
County Lines
Also in Illinois River Basin
M-6 Subregion Numbers
0 25 50
SCALE IN MILES
GREAT LAKES — ILLINOIS RIVER BASINS PROJECT
SUBREGIONS
LAKE MICHIGAN WATERSHED
U S DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMIN.
Great Lakes Re
Chicago, Illinois

FIGURE 1

MR. STEIN: Are there any comments or questions of Mr. Morton?

MR. HOLMER: I have one, Mr. Chairman.

Mr. Morton,(on page 1129) in your statement, the sentence starting the second paragraph indicates your intention to acquire nutrient reduction as soon as practicable or by July 1977 or the removal of effluents from Lake Michigan. The removal of effluents from Lake Michigan would not under your present program require the removal of nutrients?

MR. MORTON: In at least one instance it will, yes, sir. The one proposal for facilities to take the effluent from the lake will require a third stage of treatment, I don't want to use the word "advanced" treatment at this stage, but it will require a third stage treatment and nutrient removal and, of course, chlorination is involved.

MR. HOLMER: But this is not as yet a Statewide requirement in Illinois?

MR. MORTON: Not Statewide, no, sir. It is a part of all our interstate requirements, but it is not necessarily a part of all of our intrastate waters.

MR. HOLMER: Thank you.

MR. STEIN: Are there any other further comments or questions?

If not, thank you very much, Mr. Morton.

Mr. Klassen:

MR. KLASSEN: The formal recommendations of the Sanitary Water Board of Illinois will be given following all of the other presentations.

The next participant as far as Illinois is concerned involves the largest water user, public water supply user, on the lake, the City of Chicago.

The City of Chicago has undoubtedly the longest in terms of time and certainly one of the most complete records of lake water quality.

At this time I am going to call on the City of Chicago to make the presentation as the largest municipal water user. It will be done in three parts, first by Commissioner Jardine, the second by one of its assistants, and the third, more of a technical nature, by another staff member.

JAMES W. JARDINE

But at this time Commissioner James Jardine, the City of Chicago, Commissioner, Department of Water and Sewers.

STATEMENT BY JAMES W. JARDINE
COMMISSIONER, DEPARTMENT OF WATER AND SEWERS
CITY OF CHICAGO, ILLINOIS

MR. JARDINE: Chairman Stein, Commissioner Moore, distinguished Conferees, ladies and gentlemen.

I am very appreciative of the opportunity to be here today, as a representative of the City of Chicago, to outline the activities and responsibilities of the City relative to the protection and use of Lake Michigan waters.

The Chicago Water Works System provides water service to approximately 4,700,000 persons in Chicago and some 66 suburban communities, covering a total area of over 425 square miles. Our source of water is, of course, Lake Michigan. The lake also provides a full range of recreational activities including boating, fishing, swimming and nature appreciation to millions of residents of Illinois, Indiana, Michigan and Wisconsin, and countless visitors each year.

The need, the urgency, and the importance of this conference, which was called by the Secretary of the Interior, Stewart Udall, at the request of Governor Otto Kerner, cannot be overstated. While I speak only for Chicago, I am sure that there are millions of people throughout the midwest, and indeed throughout the Nation, who share the concern which has brought us here.

Because of Chicago's strategic location on the shores of Lake Michigan, the lake has served to influence the City's development as the transportation center at the heart of the midwest's agricultural and industrial complex. Indeed the history of Chicago is a saga of the efforts to control the most important physical and natural asset associated with our four States--fresh water. In this apparently never ending struggle to retain the full use of Lake Michigan waters to support the domestic, commercial, industrial, and recreational needs of Chicagoland's residents, the City has sought and received cooperation from both Federal and State agencies throughout the years. It is with a plea for continued cooperation, this time between the four States bordering the lake, that we are here today. I would like to recount very briefly some of the problems which have occurred since Chicago was incorporated as a community in 1833 and as a city in 1837.

At the time of Chicago's birth, drinking water was obtained from shallow wells or directly from the lake. At the same time the Chicago River, which flowed into the lake, was used as a receiving water for removing drainage and the sanitary wastes produced by the community's 4,000 residents. In this way, a cycle of disease potential was established. Early efforts to correct this problem encouraged the infant city to form its own water company and thereby assume municipal responsibility for protecting the public health from deadly water-borne diseases. The first attempts to obtain an uncontaminated water source were directed toward extending water intakes into the lake in a search for clean water. The first such endeavor was in 1854, when a water intake was located 600 feet from the shore. In the same year, a cholera epidemic claimed the lives of 3,300 persons or 5-1/2 percent of the population of the young city, mute testimony to the magnitude of the problem.

A further step in combating this problem was construction of the first integrated sewerage system in the United States. With its completion, the surface drainage was greatly improved. However, this improvement did not alleviate the pollution of Lake Michigan since the Chicago River's natural flow was into the lake.

In a further step to break the chain linking the water supply system with sewage disposal, water tunnels were constructed under the lake bed connecting the distribution system with the water intakes located two miles from shore. Completion of the first tunnel in 1867 attracted worldwide interest.

At the same time, steps to prevent

the flow of pollution from reaching the lake were taken. It was determined that if the Illinois and Michigan Canal, which was opened in 1848, was deepened the Chicago River could be reversed and flow away from the lake. This project, which was completed in 1871, worked well for a time. However, an expanding population increased the drainage requirements of the Chicago River, resulting in its return to its natural direction of flow into the lake.

On August 2, 1885, a torrential rainstorm blanketed the Chicago area with more than six inches of rain. The stormwaters scoured the sewer system, and the mass of pollution spread into the lake far beyond the water intakes. The result was an epidemic of typhoid fever which persisted for several years. Primarily because of this storm, a plan was developed to permanently reverse the direction of flow of the Chicago River, a plan which was carried out by a new governmental agency created in 1890, the Metropolitan Sanitary District of Greater Chicago.

While this new agency was implementing

a plan and program to accomplish its mission, the Chicago Water Department concerned itself with providing an adequate supply of high quality, safe water. In support of this objective, chlorination of the raw water at the intake cribs was begun in 1912 with all the city water furnished receiving this treatment by 1915. Shortly thereafter, liquid chlorine feed equipment was installed in all water pumping stations. These improvements resulted in a greatly reduced frequency of waterborne diseases with the annual deaths from typhoid fever, per 100,000 population, being reduced from 174 in 1891 to only 2 in 1917.

In 1923 and 1924, an epidemic of 228 typhoid fever cases occurred on the south side of Chicago, resulting in 23 deaths and increasing the need for a more rigid system of chlorination control. New equipment was installed in duplicate sets at all pumping stations. Permanent attendants were employed and trained and a comprehensive program of water sampling, testing, and pollution study was initiated under technical supervision. The effectiveness of these actions is demonstrated by the fact that since 1924 there has not been a recorded case of typhoid fever in Chicago attributable to the public water supply.

In 1924 to 1926 evidence began to accumulate that water quality was declining and pollution increasing in the southern portion of Lake Michigan. Numerous surveys were conducted and reports prepared by the United States Public Health Service and the city confirming the fact of declining water quality. Heeding the warning, the Chicago Water Department began construction, in 1926, of an experimental water filtration plant for research for the design of a full-scale plant. A Pollution Abatement Program was also launched by industrial concerns in cooperation with the City of Chicago, the Indiana Board of Health and the Metropolitan Sanitary District.

By 1931 the abatement program had significantly reduced the amount of phenol pollution in the lake. However, the relief was temporary and the further deterioration of raw water quality prompted the Department to install an ammonia-chlorine treatment plant at the Dunne Crib in 1936. The water filtration program was also accelerating rapidly and construction of the 600 million gallon per day South Water Filtration Plant was started in 1938.

Throughout the years, the Chicago Water Department has thus been able to maintain a safe water supply by introducing modern water treatment techniques and construction of two water filtration plants. The South Water Filtration Plant, which has been in full operation since 1947, was expanded by 50 percent in 1967. The Central Water Filtration Plant was placed in operation in 1964.

We are here today because we are again faced with a serious pollution problem. The intensity of pollution of Lake Michigan has had various trends over the years, both upward and downward; however, during the last 15 years, there has been a marked and alarming increase in the pollution of the lake. In an effort to provide safe water, the Chicago

Water System includes facilities for collection, treatment and distribution. Since 1955, Chicago has greatly benefited from the dynamic leadership of Mayor Richard J. Daley and during this period approximately $270,000,000 has been invested for capital improvements in the Chicago Water System. As a result, Chicago today is the only city with a population of 1,000,000 or over which enjoys a "Class One" rating by the American Insurance Association.

The system today consists of the world's two largest water filtration plants, with a combined treatment capacity of 2,600,000,000 gallons a day. The system includes over seventy miles of water tunnels and a network of over 4,000 miles of water mains fed by 11 pumping stations, with an installed capacity of 3 billion gallons a day. The complete water system has a replacement value of over one billion dollars. The average daily pumpage in 1967 was in excess of one billion gallons per day.

It is apparent from the preceding figures that Chicago has spared no expense to provide a better supply of safe water for its citizens. However, the problem extends beyond Chicago. The pollution picture is more alarming because of the strong indications of eutrophication of Lake Michigan, as well as the increase in the number and intensity of periods when the quality of lake water has been seriously affected by pollutants. This is not a Chicago problem alone; it is a problem which we all share. Information has been collected and published by the FWPCA indicating the existence of complex current patterns which means that pollution can affect the uses of Lake Michigan water many miles from the source of the pollutant. There are also alarming indications that the capacity of the lake to assimilate through natural means the variety of complex forms of pollution has been overtaxed and that we now face a very real threat to the continuation of the multi-use benefits afforded by the lake.

Greater emphasis will be given by Mr. James C. Vaughn, Engineer of Water Purification, who will detail in more quantative terms, the continued decline of water quality as indicated by increased costs of water treatment and the various parameters which serve as pollution indices. We would like to report on various steps which have been taken by Chicago in response to the critical problem faced today, both for your information and your consideration.

As you know, the Army Corps of Engineers is responsible for maintaining navigation within the various waterways. In order to maintain prescribed depths in harbors and navigable channels, the Corps of Engineers is forced to dredge periodically. In the past these dredgings were transported and dumped into selected areas of Lake Michigan.

On August 25, 1966, a resolution was introduced by the Honorable Richard J. Daley, Mayor of the City of Chicago, requesting the Corps of Engineers to study alternate means of disposing of dredgings, with this resolution being approved by the City Council. We are pleased to note that as of the present time, various means of disposal are being studied and pilot projects utilizing shore disposal already in operation. We should like to report that on September 28, 1967, the Chicago City Council passed an amendment to the Municipal Code to prohibit the discharge of untreated or inadequately treated wastes from vessels into Lake Michigan. This subject will be discussed later, in greater detail, by Mr. Richard A. Pavia, Assistant Commissioner of Water and Sewers.

We have considered at some length the problems of the past and the present and should now like to briefly comment on what the future may hold. While we are not gifted to predict the future, I might add that through the medium of this conference we can greatly influence what the future will be for Lake Michigan and the type of legacy we'll leave for posterity.

It seems obvious that unless swift and decisive actions are taken, the use of Lake Michigan as a source of drinking water will become increasingly costly, and our ability to achieve the present high quality drinking water may be difficult or impossible. Already in many areas outside of Chicago bathing beaches on Lake Michigan are frequently subject to restricted use. Recreation in the form of swimming and boating have been curtailed by physical or esthetic considerations and commercial fishing has diminished in importance. What were beautiful stretches of lakeshore have in some areas become degraded to the point where nature appreciation has been curtailed.

On the other hand, I think we can shape the future of our lake through immediate and decisive action. The levels of technology available today provide tools which we did not have in the past. We also have an informed public deeply concerned about the status of our natural resources and sympathetic toward whatever measures are judged necessary to preserve Lake Michigan for the full range of public use, both for ourselves and for future generations.

The need for action at this Four State Conference is most urgent. For this reason, I offer for your consideration the following recommendations:

1. Immediate adoption of uniform water quality standards and time schedule for implementation and enforcement covering all of Lake Michigan.

2. Immediate adoption of a uniform set of regulations for controlling wastes from watercraft; again a uniform implementation program and time schedule should apply.

3. Encourage industry to study methods of reducing pollution loads through the use of recirculation techniques designed to reduce water consumption and concentrate waste products for easier treatment.

4. Encourage industry to study methods of reclaiming useful materials from waste products and thereby reduce the cost of treatment.

5. Consider a cooperative effort

directed at developing a practical water quality surveillance program, and study the feasibility of using aerial reconnaissance techniques, as a means for measuring changes in water quality over the entire lake.

6. Support research directed toward restoration and maintenance of the natural ecology in the lake to insure the preservation of high water quality and desirable forms of aquatic life.

7. Provide adequate financial assistance for the Bureau of Fisheries to research corrective measures relative to the alewife problem.

We concur with the conclusions and generally support the recommended actions contained in the report on "Water Pollution Problems of Lake Michigan and Tributaries" issued by the Federal Water Pollution Control Administration. The battle to save Lake Michigan has already begun. Our campaign must not be one of only words. All available resources must be mobilized for a total war with the objective of an unconditional and lasting victory over the pollution of our lake.

MR. STEIN: Thank you.

MR. JARDINE: Mr. Chairman, yesterday one of the Conferees asked the question about how Chicago disposes of its filter wash water and sediment from the water filtration plants. Chicago does the same thing that most of the other filter plants on the lake in the other States do. Both the south and central filtration plants of the City of Chicago currently return both their filter wash water and sediment to Lake Michigan. This is the general practice throughout most of the country. The justification for this is generally that this material is not considered a pollutant since the organic materials it contains exists in the natural waters of Lake Michigan. The materials added through the filtration process include chlorine, alum and activated carbon. All three of these materials are inorganic.

At best, the activated carbon contained in the filter wash water would provide temporary discoloration and this could be considered esthetic pollution. However, I should like to point out that the capital improvement program for the City of Chicago covering the period of 1968 to 1972 provides $1,200,000 to study, design and construct alternate measures for both filter wash water and sediment disposal.

I repeat, while we do not consider this material as contributing to the pollution of Lake Michigan, it is our intention to correct this matter in an effort to preserve and protect the Chicago lakefront from the visible nuisance which these discharges produce.

MR. STEIN: Thank you, Mr. Jardine.

Are there any comments or questions?

I would like to compliment you on the statement and on the cooperation that we have received from the Chicago Water Department through the years.

I think, as many of you know, the

records, the painstaking records and analyses made by the Chicago Water Department served as the basis for a lot of our recommendations and a lot of our work. Without the activity of the Chicago Water Department I am certain we could not be as far ahead in the Lake Michigan abatement program as we are today. Some of you may recall that Mr. Gerstein's work--I can see that he has come in--Art Gerstein's work, who was with the Water Department, in a large measure served as the basis for the abatement program we have had for the southern end of the lake.

Also I would like to point out another fact of significance to me, that here we have a municipality, the Federal Government and the State, as far as I am concerned, working very, very closely on a concerted program to improve water quality, both water supply and pollution control. I don't think there are any institutional differences here. In other words, we show it can work. This is an instance in which it can work, and as far as we are concerned we practically work with the Chicago Water Department as one staff, with personnel, exchange of information, and so forth. I think if the relationships that we have had with intergovernmental agencies were the same that we have been able to work out with the Chicago Water Department we would be much farther ahead in meeting our water resource problems.

Thank you very much.

MR. JARDINE: Thank you, Mr. Chairman. I assure you we will continue to cooperate with you and the other Conferees in the Federal Water Pollution Control Administration.

(Applause.)

MR. KLASSEN: Problems always have solutions and difficult problems always involve a lot of discussion and controversy.

MR. STEIN: Pardon me, are the other two men who accompanied Mr. Jardine coming up?

MR. KLASSEN: Yes. This is the introduction to the next talk.

MR. STEIN: Pardon me. O. K. I didn't want you to call another witness other than them.

MR. KLASSEN: I am trying to be

subtle, Mr. Chairman. Maybe you didn't recognize it.

MR. STEIN: I recognized your subtlety, but I couldn't figure out just how subtle you were trying to be.

MR. KLASSEN: Mr. Chairman, if I have confused you, then this is a real achievement.

(Laughter.)

Only repaying you, I might say.

(Laughter.)

Seriously, the problem of pollution by watercraft is admittedly a vexing one, one for which there is not a ready solution, and the City of Chicago has taken a major step in the direction of solving this problem, at least a step in the direction. There has been a lot of controversy, a lot of comment on this.

Later I know, from having a preview of other papers, that some of the voting interests are going to make some comments on it, but Chicago has and is leading the way toward a solution, and the next presentation will be given by Richard Pavia, a Deputy

RICHARD A. PAVIA

Commissioner of Water and Sewer Department, City of Chicago, and will deal primarily with this question and what Chicago is doing and plans to do.

For many of you this is an opportunity to get firsthand and clarified some of the questions that have arisen and the problems that have arisen.

Mr. Pavia.

STATEMENT BY RICHARD A. PAVIA
ASSISTANT COMMISSIONER OF WATER AND SEWERS
CHICAGO, ILLINOIS

MR. PAVIA: Thank you, Mr. Klassen.

Mr. Stein, Mr. Moore, distinguished Conferees, ladies and gentlemen.

With your permission, and in the interest of time and your patience, I plan to delete portions of this statement which are overly repetitive from what you have been hearing for the last two days.

The water pollution problems we face today are of our own making--certainly not intentional, but perhaps a direct result of a lack of knowledge or apathy on the part of all of us. Anyone who has enjoyed boating on the waters of Lake Michigan couldn't help but be awestricken by the immense size of this inland sea. This factor in part probably accounts for our misuse. Because of the size of the lake, many would feel that its waters are not pollutable and therefore need no protection. The testimony of Mr. James C. Vaughn and others certainly refutes this belief. They have stated that the quality of Lake Michigan waters is deteriorating at an accelerated rate. Thus if we are to achieve the objective of saving Lake Michigan and preserving its waters for multiple uses, we must collectively agree upon an action program for abating all forms of water pollution.

The above observations relate to all forms of pollution including wastes from watercraft. It has been argued that the magnitude of this source of water pollution is negligible and that, at the most, minimum levels of treatment should be required. Unfortunately this theory, which has largely been advocated by persons with special interests, isn't supported by facts or accepted by the public. The area of Lake Michigan is approximately 22,400 square miles and by comparison the number of boats is small. However, vessel usage is concentrated in the locations of dense population where domestic water supply and recreational uses are at a maximum. As a result, marinas are frequently located in close proximity to bathing beaches and domestic water intakes. Along Chicago's 29 miles of Lake Michigan shoreline are some 30 bathing beaches covering 14 miles. These beaches are visited frequently by many of the seven million residents of Metropolitan Chicago. Noting that there are also eight boating marinas and anchorages located along the Chicago lakefront, it is obvious that beaches and marinas use the same waters.

To further describe the problems faced by the City of Chicago, it should be known that more than 750 overseas vessels and approximately 3,000 domestic and Canadian ships annually call at the Port of Chicago, making it the largest seaport on the Great Lakes. This is in addition to the approximately 4,000 pleasure craft which cruise the waters off Chicago; many of these craft are equipped with sanitary facilities.

Boating and bathing in the same shore waters presents a real threat of infection to swimmers. Tests were made last summer at various marinas to determine the extent of the pollution problem. During the 1967 boating season testing revealed that the average ammonia nitrogen content of harbor waters at seven marinas varied from 0.061 parts per million at the Diversey Harbor to 0.123 parts per million at the Jackson Park Harbor. When compared to the water quality criteria for shore waters established by the State of Illinois, these test samples disclose a variation of from 120 to 245 percent of the permissible annual average. The level of ammonia nitrogen is one of the primary water pollution indicators. Tests in the same marinas also revealed significant bacterial counts as the boating season progressed.

I might add that test samples also disclosed some traces of lead and oil.

While these marinas are not the control points used to survey water quality, the tests do indicate that pollution loads can be generated which at the whim of wind and current can pose a threat to nearby beaches. Sanitary wastes from watercraft are heavily concentrated in boat harbors, and quantitative analyses are not necessary to recognize the increase of algae and weed growth appearing at many Chicago harbors and marinas with increased frequency and density each year.

Because of the seriousness of the problems of water pollution, Mayor Richard J. Daley, in October 1966, appointed a committee consisting of representatives of the Chicago Board of Health, the Port of Chicago, and the Department of Water and Sewers, to review the problem of harbor pollution and determine if remedial action was needed. This committee studied the problem in depth for 10 months and on August 16, 1967, recommended that wastes from vessels should be retained for shoreside disposal. Many considerations entered into this recommendation.

In reaching this conclusion, the committee evaluated three alternatives:

1. Do nothing--and await resolution of this problem by the Federal Government. Inasmuch as these are interstate waters, it would seem that the Federal Government would have a major say-so in whatever was done. Various agencies, including the Public Health Service, have been discussing control of vessel pollution for many years with no conclusion. Therefore, we felt that this alternative was not acceptable and further delay would only increase the problem. Also, lack of direction has caused some agencies and individuals to equip their craft with unacceptable devices, thus further complicating our problem.

I might add at this point that the Corps of Engineers, in an effort to cooperate, has equipped most of their dredges and vessels with equipment which is judged unsatisfactory in these waters. Similarly, the Coast Guard has, in an effort to cooperate, equipped or in process of equipping vessels with equipment which may not be satisfactory for all of the Great Lakes.

The second alternative considered:

2. Require that all vessels and pleasure craft capable of discharging sanitary waste products be equipped with approved waste treatment devices. We discarded this alternative because the water quality criteria for Lake Michigan, developed as a result of the 1965 Interstate Pollution Conference, was at such a level that investigation failed to reveal any waste treatment device capable of satisfying this standard. This water quality criteria for Lake Michigan was developed with the participation of the States of Illinois and Indiana, and under the auspices of the Federal Water Pollution Control Administration. The criteria was submitted by the State of Indiana and approved by the Secretary of the Interior, and thereby its status in Indiana has been

changed from State Water Quality Criteria to Federal Water Quality Standards. The State of Illinois submission of water quality criteria for Lake Michigan is identical to that of Indiana. Therefore, we can only conclude that Illinois submission will be approved and thereby constitute Federal Standards. In anticipation of imminent Federal approval, we determined that it would be improper to sanction the use of waste treatment devices which could not satisfy the water quality criteria of the receiving waters.

3. Encourage the use of retention tanks or treatment devices which require no discharge to lake waters. This alternative, while presenting many difficulties for boat owners and operators, as well as governmental agencies charged with responsibilities of providing shoreside disposal facilities, was judged the only reasonable choice. We believe that the retention tank concept with or without recirculation features offers the best solution to the problem of handling

waste from watercraft in spite of the inconvenience it fosters. Boats frequently cruise on waters with widely different water quality standards. The one device which will satisfy all water quality standards, whether they be very very high or very low, is the waste retention tank. We further believe that the total cost of this solution, including necessary shoreside disposal facilities, will be the least expensive.

In evaluating this subject, major consideration was given to the fact that unlike a flowing stream where a quantity of water passes a given cross section only once, the effect of dilution in a still body of water such as a lake is less beneficial. Pollutants are, therefore, assimilated in the natural cycle and gradually increase, lowering the quality of the receiving waters to that of the discharges. In Lake Michigan, the problem is particularly acute since approximately 100 years is required for a complete water interchange.

Mayor Daley having concurred with the committee's recommendations, transmitted them to the Chicago City Council where after a Public Hearing they were approved on September 28, 1967. Attached to the statement which you have is a copy of important excerpts from Chapter 38 of the Chicago City Code, which deals with the Chicago Harbor.

(Which said document is as follows:)

Excerpts From Chapter 38
Municipal Code, City of Chicago
Pertaining To Water Pollution

City of Chicago, Richard J. Daley, Mayor
Department of the Port of Chicago
Executive Offices - Navy Pier
Chicago, Illinois 60611

January 1, 1968

The City of Chicago is most proud of its long record of accomplishments with regard to preventing pollution of Lake Michigan, and thereby preserving in large measure the future of this valuable resource for water supply, a prime source of recreation in the Midwest, and

Chicago's most important physical asset. Because of its location on the shores of Lake Michigan, at the junction of the St. Lawrence Seaway and Illinois-Mississippi inland waterway, the City of Chicago has been and will continue to be vitally concerned with and influenced by water management activities.

In support of these objectives, it shall be the policy of the City of Chicago that pollution of Lake Michigan will not be tolerated. Regulations designed to support this policy have been prepared, and the administration and enforcement of these controls will be of prime concern to appropriate City agencies.

The Federal Government, the States bordering on the Great Lakes and the City of Chicago have taken positive action in establishing programs for the prevention, regulation and abatement of water pollution, bacterial, chemical and physical, and including solid waste emanating from municipalities and industries bordering the shore of Lake Michigan. The provisions of the Municipal Code of Chicago, State an Federal regulations and statutes, all prohibit the fouling of the waters of Lake Michigan, and the enforcement of provisions designed to prevent the pollution of the waters and harbors of Chicago by vessels, both foreign and domestic, private and commercial, as well as pleasure craft, and land extensions which contribute to the pollution of Lake Michigan, are judged to be essential in order to preserve the health, welfare and safety of citizens of Chicago and all residents of the Great Lakes Region.

The following regulations are established in accordance with the provisions of Chapter 38, Sections 8, 9 and 10 of the Municipal Code, the enforcement of which rests with the Director, Department of the Port of Chicago.

A. Definitions as Stipulated in Paragraph #38-1 of Chicago's Municipal Code.

Chicago Harbor.

The harbor shall consist of the Chicago River and its branches to their respective sources and all slips adjacent to and connecting therewith, the Ogden Canal, the

Calumet River and its branches and all slips connecting therewith, the waters of Lake Calumet and all slips and basins connected therewith and all piers, breakwaters, and permanent structures therein, the Drainage Canal and all piers and basins, and the waters of Lake Michigan, including all breakwaters, piers, and permanent structures therein, for a distance of three miles from the shore between the north and south lines of the city extended, to the extent that the above-named waterways are within the territorial limits of the city.

Lake Michigan waters at Chicago

This shall include the waters of Lake Michigan for a distance of three miles from the shore between the north and south lines of the city extended, the Calumet River and its branches and all slips connecting therewith, and the waters of Lake Calumet and all slips and basins connected therewith, to the extent that the above-named waterways are within the territorial limits of the city.

River Waters

This shall include the Chicago River and its branches to their respective sources and all slips adjacent to and connecting therewith, the Ogden Canal, and the Drainage Canal, to the extent that the above-named waterways are within the territorial limits of the city.

Navigable Streams Regulated

Any public stream which is or can be made usable for water commerce. These streams come under the jurisdiction of the United States Corps of Engineers.

B. Commercial vessels

Any vessel, boat or ship operated for hire or in the commercial carriage of passengers and/or cargo or other commercial purposes.

C. Pleasure craft

Any vessel, boat or ship privately owned and operated for ordinary cruising, racing, water skiing or other recreational purposes.

D. Vessels of Local, State and Federal Agencies.

Any vessel, boat or ship publicly owned and operated by a local municipality, the State of Illinois or the U. S. Government.

E. Pollution

Pollution shall mean the

discharge or deposit in or upon such waters of sewage, industrial wastes, or other wastes containing soluble or insoluble solids of organic or inorganic nature which may deplete the dissolved oxygen content of such waters, contribute settleable solids that may form sludge deposits, contain oil, grease, or floating solids which may cause unsightly appearance on the surface of such waters or contains soluble materials detrimental to aquatic life.

ORDINANCE

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF CHICAGO:

SECTION 1. The Municipal Code of Chicago is amended by striking the existing Section 38-9 and inserting in lieu thereof a new Section 38-9 to read as follows:

"38-9. No person shall throw, dump, place, deposit or cause or permit to be thrown, dumped, placed or deposited any pollutant as defined in Section 31-2.1 (k) of this Code, or any garbage, refuse, filth, putrid or unwholesome substance, or the contents of any toilet or head, catch basin, or grease trap upon the margin or banks or within the limits or into the waters of the harbor. Discharge of any of the aforementioned pollutants within the radius of four miles of any domestic raw water intake is further expressly prohibited."

SECTION 2. The Municipal Code of Chicago is amended by adding the following new Section 38-9.1 to read as follows:

"38-9.1. In addition to the pollutants enumerated in Section 38-9 aforesaid, no operator of any vessel, craft, floats or motor boat shall discharge, dump or deposit into the harbor any fuel, solid or liquid, or the contents of any ballast tank, bilge tank or other receptacle capable of causing pollution of waters."

SECTION 3. The Municipal Code of Chicago is amended by adding the following new Section 38-9.2 to read as follows:

"38-9.2. All vessels, crafts, floats, and motor boats equipped with toilets, heads, urinals, or capable of discharging galley wastes which have not been discharged through a grease trap or grease interceptor, or solid or liquid waste from shipboard hospital facilities, shall be equipped with a waste retention tank of approved type and capacity to store such waste material for subsequent disposal at a shoreside facility."

SECTION 4. The Municipal Code of Chicago is amended by adding the following new Section 38-9.3 to read as follows:

"38-9.3. A treatment system utilizing a method of waste treatment approved by the Port Director and complying with the Rules and Regulations Establishing Water Quality Criteria for Lake Michigan as set by the Illinois Sanitary Water Board may be permissible on vessels, craft, floats or motor boats operating in harbor waters in lieu of a retention tank. The effluent of any waste treatment system not meeting the approved standards of the Illinois Sanitary Water Board shall be discharged and collected in a retention tank while such vessel, craft, floats or motor boat is located or operating within the harbor of Chicago. All such waste retention tanks must be properly equipped with pumps and piping so that wastes can be discharged from a connection located above the water line to approved shore-based or floating installations."

SECTION 5. The Municipal Code of Chicago is amended by striking Section 38-10 in its entirety and inserting in lieu thereof the following new Section 38-10:

"38-10. The Port Director shall have the authority to promulgate rules and regulations necessary to the effective control of harbor pollution.

"Any person who violates any of the provisions of Sections 38-8, 38-9, 38-9.1, 38-9.2 and 38-9.3 shall be fined not less than $50 nor more than $200 for each offense and each day's continuance of such violation shall constitute a separate offense."

SECTION 6. This ordinance shall be in force and effect from and after its passage and due publication.

MR. PAVIA: The key sections of the

revised Chicago Harbor Pollution Code read as follows:

> "38-9.2. All vessels, craft, floats and motor boats equipped with toilets, heads, urinals, or capable of discharging galley wastes which have not been discharged through a grease trap or grease interceptor, or solid or liquid waste from shipboard hospital facilities, shall be equipped with a waste retention tank of approved type and capacity to store such waste material for subsequent disposal at a shoreside facility."
>
> "38-9.3. A treatment system utilizing a method of waste treatment approved by the Port Director and complying with the Rules and Regulations Establishing Water Quality Criteria for Lake Michigan as set by the Illinois Sanitary Water Board may be permissible on vessels, craft, floats or motor boats operating in

> harbor waters in lieu of a retention tank. The effluent of any waste treatment system not meeting the approved standards of the Illinois Sanitary Water Board shall be discharged and collected in a retention tank while such vessel, craft, floats or motor boat is located or operating within the harbor of Chicago. All such waste retention tanks must be properly equipped with pumps and piping so that wastes can be discharged from a connection located above the water line to approved shore-based or floating installations."

Basically the Revised Harbor Pollution Code may be interpreted as containing the following provisions:

1. Prohibits discharges of fuel or the contents of ballast or bilge tanks or other receptacle capable of causing water pollution.
2. Prohibits discharge of marine

toilets into the lake and requires retention tanks to store such wastes for shore disposal.

3. Requires that galley wastes be passed through a grease interceptor before discharge to lake waters, or collected in a retention tank for shoreside disposal.

4. Requires that wastes from shipboard hospital facilities be collected and held in a retention tank for shoreside disposal.

5. Permits waste treatment systems on vessels or boats only if the treated effluent meets the Water Quality Criteria established by the Illinois Sanitary Water Board.

6. Establishes penalties for violations at not less than $50 nor more than $200 with each day constituting a separate violation.

While the Chicago Harbor Pollution Code specifies that the Port Director is responsible for ordinance administration and enforcement, the

City Departments of Health, and Water and Sewers together with the Chicago Park District and Illinois State Sanitary Water Board regularly provide technical assistance for his consideration. To date, the Technical Advisory Committee (TAC) has recommended the acceptability of the recirculating toilet, the electric incinerator type toilet, the gas-fired incinerator toilet (subject to local safety regulations) and provided a set of guidelines relating to retention tank size. The Advisory Committee has also recommended prohibition of the use of the portable toilet which utlizes a disposal bag and macerator-chlorinator devices. The Committee also recommended that wastes from garbage disposal units be retained for shoreside disposal.

Having elected to develop a program for controlling wastes from watercraft and to encourage the use of waste retention tanks, we immediately enlisted the support and cooperation of the Chicago Park District, a separate and autonomous City government, and the Illinois State Sanitary Water Board. Since the Chicago Park District is responsible for the operation of seven pleasure craft marinas located on the Chicago lakefront, it is obvious that their full support will be needed to insure the success of Chicago's program of protecting our waters for a full range of public use.

In passing this ordinance, the City of Chicago was well aware that criticism and problems would be abundant. However, we believe our analysis of the problem of water pollution from vessels is correct, and our evaluation of the alternatives is complete. If this be true, then the conclusion we have reached represents the best course of action open to us. We hope you will agree with this analysis and urge your consideration and support in the enactment of uniform water quality standards for all of Lake Michigan along with uniform rules and regulations to control pollution resulting from watercraft. In each case, we strongly urge that a common implementation and enforcement time schedule be adopted by all four States. Favorable consideration by the Conferees could well lead to enactment of similar regulations by the Department of the Interior, covering all of the Great Lakes. If this were the case, Federal regulations would benefit both the manufacturers of vessels and pleasure craft and the using public by permitting new vessels to be equipped with sanitation devices meeting national specifications.

The commercial vessel operators and pleasure craft owners are entitled to an end to this confusion which now surrounds the subject.

Thank you.

MR. STEIN: Thank you, Mr. Pavia.

Are there any comments or questions?

MR. POSTON: I would just like to comment very briefly that I think the City of Chicago is to be commended for the leadership they have shown in this matter of boat pollution and the way they have tackled the problem in a manner which I feel will result in abatement of this problem of boat pollution.

MR. STEIN: Are there any other comments or questions?

MR. HOLMER: Mr. Stein.

MR. STEIN: Yes.

MR. HOLMER: I want to commend Chicago for what it has done in this area and the importance of achieving a degree of uniformity in the establishment of these regulations is reflected in your report and is heartily endorsed by Wisconsin.

My question, at least the first one, has to do with the commercial vessels, those engaged in interstate and foreign commerce.

Is it expected that these will cause for Chicago enforcement any particular problems? I know your ordinance affects only operations within harbor waters. Is this a significant problem now as far as the commercial vessels are concerned?

MR. PAVIA: Well, there are really two major groups, the overseas shippers and, of course, the domestic or Great Lakes lines. I would be less than honest if I said that we didn't foresee any problems there, but I do think that thus far, on the basis of the information we have received, the overseas carriers seem to indicate their willingness to cooperate. But they keep pointing out that what they would like to see happen here is that rather than have to serve a variety of sets of regulations, they would like to see one set of regulations for all of the Great Lakes. And, of course, I think we all endorse this concept.

But in the interest of the Chicago ordinance, they do intend to make arrangements this year; in fact, many of them are talking about putting on temporary units at Montreal when they enter the St. Lawrence River and having them serviced during the entire stay in the Great Lakes.

MR. HOLMER: You dealt with the Federal involvement in this process rather lightly in your paper. I know you considered it at some length, and I am sure that most of the people in the room are aware of the Federal legislation which deals rather directly with this subject but has not, apparently, been very effective, and, of course, is addressed to the major vessels rather than to the pleasure craft.

Is there a possibility still in

your mind that the problem of regulations of this matter ought to be the subject of a Federal standard rather than a regional standard?

MR. PAVIA: Mr. Holmer, very definitely. I might add that at this point there is a report before the U. S. Congress which has been prepared by the Federal Water Pollution Control Administration and there is also a Senate Bill 2525 which would give the Secretary of Interior the regulatory powers on vessels.

However, I think that inasmuch as this bill may have some difficulty, it would certainly be of great assistance to the Secretary of Interior if four States could agree on something, and I am sure that this would go a long way towards initiating passage.

MR. HOLMER: Thank you.

MR. STEIN: Are there any other comments or questions?

If not, thank you very much for a very complete presentation. You know, Mr. Pavia, for a long time at these conferences and water pollution control meetings we were getting a lot of talk on boat pollution but very little direction. I think the analysis here indicates that we may have a solution in sight. You are to be commended for your presentation.

MR. PAVIA: Thank you.

(The complete statement of Mr. Pavia is as follows:)

STATEMENT BY RICHARD A. PAVIA
ASSISTANT COMMISSIONER OF WATER AND SEWERS
BEFORE THE FOUR STATE WATER POLLUTION CONFERENCE
FEBRUARY 2, 1968

Mr. Chairman, Conferees, distinguished officials, ladies and gentlemen.

For the past two days you have heard discussions concerning the vital problems of Lake Michigan pollution. Those of us from the four States bordering Lake Michigan, as well as many other people throughout the Midwest, consider the waters of Lake Michigan as our single most valuable natural resource and perhaps the most impressive physical feature within our region. Lake Michigan is used for a multitude of purposes including water supply, navigation, swimming, boating, fishing, and esthetic appreciation.

Over the last year it has been increasingly rare to read a newspaper or magazine which has not mentioned the problems we face because of the threat of air and water pollution. There is no question but that tho general public has become aroused and intensely concerned with the importance of environmental factors. Contamination of one's environment is a very personal matter, because we all are dependent upon the atmosphere we breathe and the water we drink. Yesterday's presentation by the Federal Water Pollution Control Administration makes clear that water pollution knows no boundaries and what one State or city does may have a very serious effect on a neighboring community.

The water pollution problems we face today are of our own making--certainly not intentional, but perhaps a direct result of a lack of knowledge or apathy on the part of all of us. Anyone who has enjoyed boating on the waters of Lake Michigan couldn't help but be awestricken by the immense size of this inland sea. This factor in part probably accounts for our misuse. Because of the size of the lake, many would feel that its waters are not pollutable and therefore need no protection. The testimony of Mr. James C. Vaughn and others certainly refutes this belief. They have stated that the quality of Lake Michigan waters is deteriorating at an accelerated rate. Thus if we are to achieve the objective of saving Lake Michigan and preserving its waters for multiple uses, we must collectively agree upon an action program for abating all forms of water pollution.

The above observations relate to all forms of pollution including wastes from watercraft. It has been argued that the magnitude of this source of water pollution is negligible and that, at the most, minimum levels of treatment should be required. Unfortunately this theory,which has largely been advocated by persons with special interests, isn't supported by facts or accepted by the public. The area of Lake Michigan is approximately 22,400 square miles and by comparison, the number of boats is small. However, vessel usage is not uniformally distributed over the entire lake area but instead is concentrated in the locations of dense population where domestic water supply and recreational uses are a maximum. As a result, marinas are frequently located in close proximity to bathing beaches and domestic water intakes. Along Chicago's 29 miles of Lake Michigan shoreline are some 30 bathing beaches covering 14 miles. These beaches are visited frequently by many of the seven million residents of metropolitan Chicago. Noting that there are also eight boating marinas and anchorages located along the Chicago lakefront, it is obvious that beaches and marinas use the same waters.

To further describe the problems faced by the City of Chicago, it should be known that more than 750 overseas vessels and approximately 3,000 domestic and Canadian ships annually call at the Port of Chicago, making it the largest seaport on the Great Lakes. This is in addition to the approximately 4,000 pleasure craft which cruise the waters off Chicago; many of these craft are equipped with sanitary facilities. Boating and bathing in the same shore waters presents a real threat of infection to swimmers.

Tests were made last summer at various marinas to determine the extent of the pollution problem. During the 1967 boating season testing revealed that the average ammonia nitrogen content of harbor waters at seven marinas varied from 0.061 ppm at one marina (Diversey) to 0.123 ppm at another (Jackson Park). When compared to the water quality criteria for shore waters established by the State of Illinois, these test samples disclose a variation of from 120 to 245 percent of the permissible annual average. The level of ammonia nitrogen is one of the primary water pollution indicators. Tests in the same marinas also revealed significant bacterial counts as the boating season progressed. While these marinas are not the control points used to survey water quality, the tests do indicate that pollution loads can be generated which at the whim of wind and current can pose a threat to nearby beaches. Sanitary wastes from watercraft are heavily concentrated in boat harbors, and quantitative analyses are not necessary to recognize the increase of algae and weed growth appearing at many Chicago beaches and marinas with increased frequency and density each year.

Because of the seriousness of the problems of water pollution, Mayor Richard J. Daley in October 1966 appointed a committee consisting of representatives of the Chicago Board of Health, the Port of Chicago, and the Department of Water and Sewers, to review the problem of harbor pollution and determine if remedial action was needed. This committee studied the problem in depth for ten months and on August 16, 1967, recommended that wastes from vessels should be retained for shoreside disposal. Many considerations entered into this recommendation.

In reaching this conclusion, the committee evaluated three alternatives:

1. Do nothing--and await resolution of this problem by the Federal Government. Various agencies including the Public Health Service have been discussing control of vessel pollution for many years with no conclusion, therefore, we felt that this alternative was not acceptable and further delay would only increase the problem. Also, lack of direction has caused some agencies and individuals

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to equip their craft with unacceptable devices, thus further complicating our problem.

2. Require that all vessels and pleasure craft capable of discharging sanitary waste products be equipped with approved waste treatment devices. We discarded this alternative because the water quality criteria for Lake Michigan developed as a result of the 1965 Interstate Pollution Conference, was at such a level that investigation failed to reveal any waste treatment device capable of satisfying this standard. This water quality criteria for Lake Michigan was developed with the participation of the States of Illinois and Indiana, and under the auspices of the Federal Water Pollution Control Administration. The criteria was submitted by the State of Indiana and approved by the Secretary of the Interior, and thereby its status in Indiana has been changed from State Water Quality Criteria to Federal Water Quality Standards. The State of Illinois submission of water quality criteria for Lake Michigan is identical to that of Indiana. Therefore, we can only conclude that Illinois submission will be approved and thereby constitute Federal Standards.

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In ancitipation of imminent Federal approval, we determined that it would be improper to sanction the use of waste treatment devices which could not satisfy the water quality criteria of the receiving waters.

3. Encourage the use of retention tanks or treatment devices which require no discharge to lake waters. This alternative, while presenting many difficulties for boat owners and operators as well as governmental agencies charged with responsibilities of providing shoreside disposal facilities, was judged the only reasonable choice. We believe that the retention tank concept with or without recirculation features offers the best solution to the problem of handling waste from watercraft in spite of the inconvenience it fosters. Boats frequently cruise on waters with widely different water quality standards. The one device which will satisfy all water quality standards, whether they be very very high or very low, is the waste retention tank. We further believe that the total cost of this solution including necessary shoreside disposal facilities will be the least expensive.

Major consideration was given to the fact that unlike a flowing stream where a quantity of water passes a given cross section only once, the effect of dilution in a still body of water such as a lake is less beneficial. Pollutants are assimilated in the natural cycle and gradually increase, lowering the quality of the receiving waters to that of the discharges. In Lake Michigan the problem is particularly acute since approximately 100 years is required for a complete water interchange.

Mayor Daley having concurred with the committee recommendations, transmitted them to the Chicago City Council where after a public hearing they were approved on September 28th. The key sections of the revised Chicago Harbor Pollution Code read as follows:

> "38-9.2. All vessels, craft, floats and motor boats equipped with toilets, heads urinals, or capable of discharging galley wastes which have not been discharged through a grease trap or grease interceptor, or solid

or liquid waste from shipboard hospital facilities, shall be equipped with a waste retention tank of approved type and capacity to store such waste material for subsequent disposal at a shoreside facility."

"38-9.3. A treatment system utilizing a method of waste treatment approved by the Port Director and complying with the Rules and Regulations Establishing Water Quality Criteria for Lake Michigan as set by the Illinois Sanitary Water Board may be permissible on vessels, craft, floats or motor boats operating in harbor waters in lieu of a retention tank. The effluent of any waste treatment system not meeting the approved standards of the Illinois Sanitary Water Board shall be discharged and collected in a retention tank while such vessel, craft, floats or motor

boat is located or operating
within the harbor of Chicago.
All such waste retention tanks
must be properly equipped with
pumps and piping so that wastes
can be discharged from a connection located above the water
line to approved shore-based or
floating installations."

Basically the Revised Harbor Pollution Code may be interpreted as containing the following provisions:

1. Prohibits discharges of fuel or the contents of ballast or bilge tanks or other receptacle capable of causing water pollution.

2. Prohibits discharge of marine toilets into the lake and requires retention tanks to store such wastes for shore disposal.

3. Requires that galley wastes be passed through a grease interceptor before discharge to lake waters or collected in a retention tank for shoreside disposal.

4. Requires that wastes from shipboard hospital facilitiesbe collected and held in a

retention tank for shoreside disposal.

5. Permits waste treatment systems on vessels or boats if the treated effluent meets the Water Quality Criteria established by the Illinois Sanitary Water Board.

6. Establishes penalties for violations at not less than $50 nor more than $200 with each day constituting a separate violation.

While the Chicago Harbor Pollution Code specifies that the Port Director is responsible for ordinance administration and enforcement, the City Departments of Health, and Water and Sewers together with the Chicago Park District and Illinois State Sanitary Water Board regularly provide technical assistance for his consideration. To date, the Technical Advisory Committee (TAC) has recommended the acceptability of the recirculating toilet, the electric incinerator type toilet, the gas-fired incinerator toilet (subject to local safety regulations) and provided a set of guidelines relating to retention tank size. The TAC also has recommended prohibition of the use of the portable toilet which utilizes a disposal bag and macerator-chlorinator devices. The committee also recommended that wastes from garbage disposal units be retained for shoreside disposal.

Having elected to develop a program for controlling wastes from watercraft and to encourage the use of waste retention tanks, we immediately enlisted the support and cooperation of the Chicago Park District, a separate and autonomous city government, and the Illinois State Sanitary Water Board. Since the Chicago Park District is responsible for the operation of seven pleasure craft marinas located on the Chicago lakefront, it is obvious that their full support will be needed to insure the success of Chicago's program of protecting our waters for a full range of public use.

In passing this ordinance the City of Chicago was well aware that criticism and problems would be abundant. However, we believe our analysis of the problem of water pollution from vessels is correct, and our evaluation of the alternatives is complete. If this be true, then the conclusion we have reached represents the best course of action open to us. We hope you will agree with this analysis and urge your consideration and support in the enactment of uniform water quality standards for all of Lake Michigan along with uniform rules and regulations to control pollution resulting from watercraft. In each case we strongly urge that a common implementation and enforcement time schedule be adopted by all four States. Favorable consideration by the Conferees could well lead to enactment of similar regulations by the Department of the Interior, covering all of the Great Lakes. Federal regulations would benefit both the manufacturers of vessels and pleasure craft and the using public by permitting new vessels to be equipped with sanitation devices meeting national specifications.

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MR. STEIN: Mr. Poston.

FEDERAL PRESENTATION

(CONTINUED)

GENERAL ROBERT M. TARBOX

MR. POSTON: Our next presentation is to be General Robert Tarbox, the Division Engineer for the Corps of Engineers. He has a presentation on the Corps of Engineers activities.

STATEMENT BY
BRIGADIER GENERAL ROBERT M. TARBOX
DIVISION ENGINEER, NORTH CENTRAL DIVISION
CORPS OF ENGINEERS

GREAT LAKES DREDGINGS DISPOSAL PROBLEM

GEN. TARBOX: Mr. Chairman, gentlemen. I am Brigadier General Robert M. Tarbox, Division Engineer, North Central Engineer Division. My headquarters is in Chicago. North Central Division is responsible for Corps of Engineers Civil Works functions in the Great Lakes Basin.

The U. S. Army Corps of Engineers appreciates the opportunity to present at this conference information on our program to identify the pollution problems associated with the disposal of polluted dredgings, and to develop procedures for insuring that State water standards are met. We believe it will be helpful in your consideration of actions needed to improve and preserve the quality of the Lake Michigan waters. The information is in two parts:

a. A brief narrative of the Corps approach to identify the problem and to determine solutions that are in the best public interest; and

b. Our proposal for actions during the transition period prior to determination of long-term solutions.

Lt. General Cassidy, the Chief of Engineers, regrets that he is not able to discuss this with you himself, and he has asked me to present this report to you.

(Slides marked Conference Exhibit No. 6 are on file at the FWPCA office in Washington, D.C., with copies at the Regional Office, Chicago, Illinois.)

Shipping and Development:

To the American economy, transportation of commodities on the Great Lakes is a most important use of this great natural resource.

And I have a slide there that shows the flow of iron ore through the Great Lakes.

There have been tremendous population growth and intensive industrial developments along the shores of Lake Michigan, in part because of low-cost water transportation.

This slide shows the U. S. Great Lakes commercial harbors that have been developed. These expensive industrial developments along the shores of Lake Michigan have been in part because of low cost water transportation.

Both have contributed to a serious pollution problem which, in some localities, impairs the aesthetics and recreational aspects of the water resource, threatens its utility as a source of water supply, and pollutes the materials which we must dredge in our harbor maintenance.

Maintenance Dredging:

The need to dredge arises because of the location of harbors on the Great Lakes, predominantly at the mouths of rivers flowing into the lakes. In many instances, the rivers, in their flood flows and freshets, carry heavy sediment loads into the harbor channels. This accounts by far for the major portion of the material to be dredged. In other instances, it consists largely of bars at the harbor entrance, resulting from the drift of lake sand along the shore.

In general, although not entirely, for more than 40 years we have placed the dredged material in authorized disposal areas in deep-water areas of the lakes.

I have a slide that shows these authorized disposal areas on Lake Michigan. They are the little red dots that you see all along the shore of the lake. The one at the southern end of the lake is the one that is authorized for the ports in the vicinity of Chicago. But you can see these dots that go all along both sides of the shore. They are the authorized disposal areas plotted to scale on this map.

The areas were selected so as to be remote from water intakes and swimming beaches. During this time there is no history of contamination of beaches or water supply intakes attributed to lake disposal dredgings.

Now, I should make it clear that not all of the harbors on the Great Lakes are polluted. Of the Lake Michigan ports tested by FWPCA, it appears that at more than half of them the material to be dredged is suitable for disposal in the lake.

The Problem:

In early 1966 we investigated the feasibility of alternate disposal areas for a number of the Great Lakes harbors. Realizing that we had to insure that we would not degrade the quality of the water in the Great Lakes, we looked at the possibility of using diked disposal areas. However, one does not have to look at more than a city map of any of the ports which have grown and thrived with the commerce resulting from our navigation projects to realize that unused land on which dredge spoil can be placed just is not available, in most cases, within a reasonable distance of the harbor and channel which must be maintained each year. And in most ports where there is intensive land use, additional filled areas of the type that dredged material would provide are not desired by local interests.

Now, this aerial photograph I have projected here is of the central portion of the City of Cleveland. You can see the Cuyahoga River winding up through the central portion of the area and the intensive development there, not only in the City but also along the harbor. The Cuyahoga River winding through this area. As you can see, there just isn't land available there that could be used for alternate disposal areas.

In considering the use of more distant land disposal areas, the costs of rehandling the dredged materials and transporting them rapidly drive the costs of maintenance sky high. So we took a look at how we could dispose of large quantities of dredge spoil along shore, alongside of the breakwater in or near the harbor, or in shallow water areas of a bay. And let me explain, gentlemen, that when I refer to "large quantities of dredge spoil," I am talking about quantities like 150,000 cubic yards which have to be taken from Calumet Harbor and Channel, at Chicago, each year. To give you an idea of the size of the problem, that amount would fill this Bal Tabarin Room 30 times over each year, or, if spread over one Chicago City block, would be about 20 feet deep. Or, take a look at this one: We dredge over one million cubic yards of spoil from the outer harbor and the Cuyahoga River at Cleveland, which is shown here, during our maintenance each year. That amount would cover a City block of Cleveland about 150 feet deep.

The use of the diked disposal areas that I mentioned would provide some worthwhile benefits.

This industrial area has resulted from dike disposal area. Being adjacent to or in the port area, they could provide valuable land for commercial use. In some areas, the new land would meet needs for recreation areas adjacent to the water. However, in most cases, the users would have to wait several years for the area to be filled and, after filling, for the material to consolidate and dry out before the land could be developed.

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Our investigation indicated that, at most ports where the bottom material is polluted, there are possibilities for the use of diked disposal areas. However, it was estimated that the cost of constructing the dikes to hold the quantities involved, plus the increased costs of handling the material, would substantially increase the cost of harbor maintenance. The increase in cost varied considerably from harbor to harbor, but in general the net cost per cubic yard of maintenance dredging would be increased from two to five times.

I must point out that placing the dredged material in a diked enclosure is not necessarily a panacea in the solution of pollution problems, with only higher costs involved. Placing dredged material on shore may increase the possibility of pollution to the surrounding area. The dredged material is taken from the water; in some cases it is even conveyed hydraulically; and it is, at best, wet.

I have a couple of slides here which will illustrate that. Here is the dipper bucket from a dipper dredge picking up the material from the bottom, and you can see that wet is a good adjective there.

This is a hydraulic dredge that is used in some type of maintenance dredging with the head on the bottom at the left hand end picking up the material off of the harbor floor, of the channel bottom, it goes up through these pipes through the dredge and out the bottom along this pipeline. It is conveyed with the water and about 85, roughly, percent of the material that comes out is water.

There you see the other end of the pipeline discharging the dredge spoil in a diked disposal area, on land.

While a diked area will retain most of the solids, there will be an effluent that will run out. The dissolved contaminants and suspended solids in the effluent could have an adverse effect on water quality, bathing beaches or fish and wildlife habitat, and we could have the problem of treating the effluent.

I must point out also that in seeking alternate areas for disposal of the dredged materials, a new question is raised concerning the responsibilities of local interests to provide the diked disposal areas at local cost. Many of these lake harbors were authorized for construction with the provision that materials dredged in the annual maintenance of these harbors be placed in lake disposal areas.

Again here is the map showing our lake disposal areas.

Use of lake disposal areas was specified in almost all of the authorizing documents for the Great Lakes harbors before the days of the Water Pollution Control Act and related legislation. There was and is a distinct economic advantage to lake disposal. In fact if the economics of the justification for some of the projects had been based on use of other more expensive methods, these would not have been economically justified, and thus would not have been recommended for authorization and for construction. It is the current U. S. policy, however, where land disposal is required for local interests to provide the diked disposal areas without cost to the Federal Government as an item of local cooperation.

Returning to my report, based on our investigations we developed a four-year program for construction of diked disposal areas at the 15 most critically polluted harbors of the Great Lakes, and in the early fall of 1966 we presented the program to the Bureau of the Budget. Our estimate indicated that it would cost $95,566,000 to construct the 15 diked disposal areas, and that the additional annual cost of dredging and use of these areas would amount to $3,000,000.

The Pilot Program:

The Bureau of the Budget expressed the view that before the taxpayers were requested to carry the burden of additional harbor maintenance cost, there should be further study of alternatives and further consideration of the public benefits of using alternative methods of dredgings disposal. The Bureau requested that we and the FWPCA jointly conduct a pilot study of the program.

GENERAL ROBERT M. TARBOX

We were asked to study alternate means of disposing of dredged material, the pollution effects of the alternates, and the costs. The FWPCA was asked to assist us in determining the effects and to identify the benefits that would be gained from the various alternatives. In August 1966 we received $1 million to begin the study, and we were granted an addition $5 million in fiscal year 1968 to continue it. We expect to receive sufficient funds to complete the study in fiscal year 1969.

Early in 1967 we initiated our Pilot Program for Disposal of Dredgings from Great Lakes Harbors. In March the Department of the Army and the Department of the Interior issued a joint public statement announcing agreement of the two Departments that joint effort is required for the development of acceptable alternative disposal means, with the ultimate objective of providing leadership in the Nationwide effort to improve water quality through prevention, control and abatement of water pollution by Federal water resources projects. This joint effort is the Pilot Program of the Corps and the FWPCA. Its objective is to develop the most economical methods for management of whatever pollution problems may result from dredging operations on the Great Lakes.

The Federal Water Pollution Control Administration is participating in the program by sampling, testing and analyzing the materials to be dredged and the waters surrounding them, as well as by participating in discussions of various methods under study. The Fish and Wildlife Service of the Department of the Interior and the Public Health Service of the Department of Health,Education and Welfare are also advising us.

The Corps has engaged the services of a Board of Consultants to assist us in the Pilot Program. The Board consists of five members, each eminent in his field: Dr. Gordon M. Fair of Harvard University and Dr. Gerard A. Rohlich of the University of Wisconsin, are both sanitary engineers; Dr.

Alfred M. Beeton, Assistant Director, Center for Great Lakes Study, University of Wisconsin, is our consultant on biology; Dr. Fred Gurnham, Illinois Institute of Technology, is our consultant on chemical engineering; and Mr. Sanford S. Farness, Michigan State University, is our consultant on urban planning.

Eight localities on the Great Lakes have been selected for the Pilot Program. These are shown on the map that is projected on the screen. We have Great Sodus Bay on Lake Ontario, then Buffalo, Cleveland, and Toledo Harbor on Lake Erie and the Rouge River at Detroit, and then on Lake Michigan Indiana Harbor, Calumet Harbor and Green Bay Harbor. They were selected for two basic reasons: (1) to test the effectiveness and compare costs of different types of disposal areas, structures, methods of handling the dredged material, and methods of treating any effluent from the disposal areas; and (2) to obtain this data at various representative harbors, with the degree of pollution varying from heavy to negligible.

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Great Sodus Bay is a harbor with no discernible pollution problem. It is shown on the slide. The others are considered to be polluted to various degrees.

To mention a few examples of methods under investigation:

This slide shows the enclosed area we have built at Buffalo; there we are looking at the suitability of slag as a material for constructing dikes for a disposal area where the dredged spoil would be placed within the enclosure mechanically rather than hydraulically. This is the enclosure that we are using. The dredge spoil is brought down the Buffalo River in skows out into the outer harbor, tied up alongside the enclosure there. This crane on this barge here (indicating) has lifted it off and put it in the enclosure. We got a great deal of valuable data in 1967 at this project. In 1968 we are going to vary the method a little bit using the hydraulic methods of bringing the material and putting it into the enclosed area.

This is a slide of our experimental

area at Cleveland, and here you see a self-unloading ship constructing a diked area. The dikes here are made of crushed rock with a filter blanket. Here we have another finger which forms a slit, the barges containing the material that has been dredged from the Cuyahoga River and the Cleveland Harbor are brought into that slit, the material is deposited in the slit and then pumped hydraulically into the enclosed area, and there we want to experiment with how to treat or handle the effluent that results.

This is a view of the area at Indiana Harbor. Here we have a water area completely enclosed except for a gap to allow the entrance of dump skows, and we have experimented with closing that gap by means of an air curtain. This is enclosed with sheet steel piling except at the gap, and there it only comes to within 12 feet of the floor of the harbor entrance there. We brought our skows down the channel and into here (indicating) and spread the material uniformly over the bottom.

At Calumet we are able to test certain

aspects of disposal areas that are completely onshore. This shows the area there. The Calumet Channel, the skows are brought into this slit, they are dumped on the bottom there, and then the material is conveyed hydraulically through pipelines and is spread out over this area (indicating) in a manner similar to that slide I showed you with the discharge from the pipeline.

At Green Bay we have two areas; this one shows the dikes the City built around a disposal area on low ground, where the City wants to develop some land. These are the dikes surrounding the area. The material is brought in by skow and then pumped into that area. This slide shows the diked areas that we formed in the shallow waters of the Bay utilizing the material that we dredged to form the dike.

Here we have a picture of the diked disposal area in Maumee Bay at Toledo. This is a facility for tying up our hopper dredge and pumping material all through a pipeline enclosed through the--spread itself out over the area there.

This area shows our area in the Rouge River at Detroit with the dredge tied up and pumping out. This is the pipeline leading out to the area and then the material spreads out within the diked area.

At a number of locations we will test various methods of treating the effluent from the disposal operation. The feasibility of disposal in pits, mines and other areas away from the lake is also being investigated.

An important part of the Pilot Program consists of sampling water and bottom sediments at the dredging areas and in the vicinity of the alternate disposal areas and conducting various tests on the samples.

This slide shows the Corps of Engineers lakes survey boat,Shenahon, which is a floating test boat and laboratory. Some of the tests on material are being accomplished right in this laboratory.

The samples are being taken before, during and after the dredging operations.

We are working to complete our

investigations and to render a report by December 1968. However, we are hoping that we can have some preliminary information by next fall in time for the budget hearings on the fiscal year 1970 program. In our report we will present our recommendations on alternate methods of disposing of and treating polluted dredged materials, including the economic implications of any significant changes in maintenance costs. We contemplate presenting recommendations for each individual harbor. We will include recommendations on any cost sharing required of local interests. We will include our recommendations for any legislation required to carry out the alternate methods of disposing and of cost sharing.

Local Cooperation:

I emphasize local interest participation because in some quarters the disposal of dredgings from navigation channels is considered to be solely a Corps of Engineers problem which the Corps can solve simply by putting the dredgings on land rather than in the authorized lake disposal areas. However, while the Congress has assigned to the Corps the work of providing and maintaining navigation depths at authorized river and harbor projects, the current Congressional policy in connection with such projects has been that where they are needed disposal areas and retaining dikes or bulkheads will be provided by local interests at local expense as a part of the local cooperation required for the projects.

Of additional concern to local industry and commerce using Great Lakes harbors, is the necessity to dispose of materials dredged from private and public slips and alongside of docks, outside of the Federal channel. It is the responsibility of the owner to get this done and to pay for it.

This slide illustrates what I am talking about. In white you have the Federally authorized and maintained projects. We, the Corps of Engineers, do the dredging of the area shown in white. Here is the area between the Federal projects and the public wharf, which the local authorities have to dredge. Here is the area between the Federal project and a private wharf, which the owner of that installation has to maintain. And again the industry or commercial enterprise that has this private slip (indicating) has to maintain the depths in that area so that the ships which he has come in there can use it.

I repeat, it is the responsibility of the owner to get this done and to pay for it.

Actions by the Corps:

At this point it is appropriate that I set forth the various actions the Corps of Engineers is taking in disposal of dredged material:

1. Under the Pilot Program, alternate methods and areas for disposal of dredged material containing pollutants were used during the calendar year 1967 dredging program at six localities: Buffalo, Toledo, River Rouge at Detroit, Indiana Harbor, Calumet Harbor and Green Bay. The last three localities are on Lake Michigan. During 1968 we plan to add Cleveland to this list on a pilot scale.

2. In addition to the Pilot Program

localities, arrangements are being made for the use of alternate disposal areas at Monroe Harbor on Lake Erie, and at New Buffalo, Manitowoc and Menominee Harbors on Lake Michigan. At Monroe, a land disposal site has been provided by the Port Authority and hopefully the diking will be completed to permit use of the area in 1968. At New Buffalo a land disposal site will receive dredgings when maintenance is next required. At Manitowoc and Menominee alternate disposal areas will be used to receive dredgings during 1968.

3. During the next few months, each district engineer is visiting local authorities at every port where the FWPCA has reported that the material to be removed by dredging contains pollutants. They will be informed of the extent of the problem and of the requirement for the use of suitable alternate areas and methods of disposal of polluted dredged materials. Their assistance in obtaining such areas for the use of the Corps and also by private contractors on permit dredging will be requested.

Proposal for 1968:

There are 31 harbors on Lake Michigan where maintenance dredging is required during calendar year 1968, if authorized navigation depths are to be maintained. More than half of the harbors are considered to be clean.

While at this time we are still developing long-term solutions for disposal of dredgings from polluted harbor areas, interim solutions have been and will be necessary. Our proposals for the calendar year 1968 dredging program are as follows:

1. The Corps plans on placing no polluted dredged material in Lake Michigan from Calumet and Indiana Harbors during calendar year 1968.

2. At other polluted harbors, alternate disposal areas will be used during 1968 where arrangements can be made for suitable areas.

3. Ports where the FWPCA has determined that the channel and harbor contain polluted materials and where local authorities are

unable to provide a suitable alternate disposal area in 1968 will be individually considered. Where postponement of maintenance would result in an economic hardship for the port and region, the maintenance dredging will be accomplished as authorized by the Congress in the 1968 maintenance program, with the dredged materials placed in the authorized disposal area in the lake.

4. At ports where the FWPCA has determined that there are no pollutants in the material to be dredged, the clean dredged materials will be placed in the authorized disposal areas in the lakes.

5. The Pilot Program for determining alternate systems for disposal of polluted dredged materials will be completed by the end of 1968. The feasibility and efficacy of each method of handling, moving, treating and containing various types of polluted dredged materials and the applicability to each local port will be known.

6. The Pilot Program report will recommend use of alternate disposal areas

for the disposal of polluted dredged material at some harbors where the material is now being placed in lake disposal areas. The report will consider and make recommendations for legislation, where appropriate, to include consideration of the share that local interests should bear of the costs of alternate disposal methods in accordance with the current policy for new projects. The report will also address itself to the question of economics of alternate maintenance methods.

Conclusion:

In summary, the Corps of Engineers agrees wholeheartedly that everything possible should be done to ensure water of acceptable quality in the Great Lakes. The Corps is enthusiastically working with FWPCA and others to determine means of disposal and management of dredged materials so that they will not degrade the water quality of the lakes. We hope that we will have information from our joint study this fall in time for the budget hearings on the fiscal year 1970 program, and we expect to complete the study in December of this year.

Meanwhile, it is essential that everyone understands that this problem of dredgings disposal implies local and State responsibilities also. Local interests may have to locate and provide suitable disposal areas when the degree of pollution of the dredged material prevents its disposal in the lake, and may have to share with the Federal Government the added costs incurred.

We need your understanding of the problem and your assistance in reaching a solution in the best public interest. Immediate absolute interdiction of disposal of any dredged materials in the Great Lakes is as impracticable as telling the cities discharging heavy pollutants into the Illinois Waterway to discontinue the practice today. We can introduce new harbor maintenance procedures in the same time frame that communities are being given for adoption of improved treatment plants, and our problems will be greatly reduced as communities and industries effect a better treatment of their wastes.

A transition period is needed. We are in that period, and I can assure you that whatever pollution problems there are associated with the maintenance of ports can be corrected in accordance with the time schedule developed for other aspects of the clean waters program.

Thank you, Mr. Chairman.

MR. STEIN: Thank you.

Are there any comments or questions?

Mr. Oeming.

MR. OEMING: General, could you tell us what the depths are in these authorized areas in Lake Michigan now where the disposal is taking place, approximately?

GEN. TARBOX: They vary, Mr. Oeming, but in the majority of the cases they are greater than 50 feet.

MR. OEMING: One more question, General.

Are there any dredgings from the Chicago River or the canal taken into the lake?

GEN. TARBOX: You mean right now, this year?

MR. OEMING: Last year.

GEN. TARBOX: We did not maintain the Chicago River and the canal last year.

MR. OEMING: The last time you maintained it, then?

GEN. TARBOX: Yes, the last time we maintained it they were put there.

MR. OEMING: Would that be put in the program if you had to maintain it in the future, the dredgings from the Chicago River and the canal?

GEN. TARBOX: I have stated, Mr. Oeming, that we will not place any polluted dredged materials from the ports of Chicago in Lake Michigan.

MR. OEMING: I see.

GEN. TARBOX: And we are working on alternate methods of disposal of the polluted materials from those ports.

MR. OEMING: Thank you.

MR. STEIN: Let me clarify this by a question, General, before we have these other ones, as long as you are on that point.

When you talk about polluted dredged material from Calumet and Indiana Harbor, what other kind of material is in that harbor except polluted material?

GEN. TARBOX: They are polluted.

MR. STEIN: Yes. In other words, there will be no dredged material, as I read this--and this is just for clarification, the first point--no dredged material from Calumet and Indiana Harbor will be placed in the lake during calendar year '68. Is that a fair reading?

GEN. TARBOX: I did want to bring this out, Mr. Chairman--now that you have raised the question--that in Calumet Outer Harbor there are some rock pinnacles where the navigation depths are not quite down to the authorized depth. They have no fine grain sediments on top of them; they are just pure clean rock. We would expect that good clean rock, there would be no objection to placing that in the authorized disposal area in Lake Michigan.

MR. STEIN: I want to make that point clear, but you have raised that and I am not prejudging your point. However, in discussion with our Fish and Wildlife friends in the Department of the Interior, I don't know that we have a complete unanimity of view yet on the effect of good clean rock on the bottom. They say, you know, "you say this is chemically pure" and stuff. This is like saying possibly you don't object if someone wants to give you a blood transfusion with distilled water since it is purer than your blood, and they are not sure they can stand all that purity.

(Laughter.)

But I think this is a question we have to resolve and I think the facts are clear on what your program is in the harbor.

GEN. TARBOX: Yes, sir, I think that that will be one of the--I hope this will be one of the problems that the conferees will seriously consider--

MR. STEIN: Yes..

GEN. TARBOX: --because it is a matter of economics.

MR. STEIN: Yes.

GEN. TARBOX: What are the benefits

that are going to be obtained from not placing some of the clean material in the lake.

MR. STEIN: Yes. All right.

Yes, sir.

MR. POOLE: General Tarbox, you indicated that the Pilot Program would be completed by the end of 1968, calendar '68. Our papers last week carried items on the Federal budget and there was a $7,000,000 item in there for fiscal '68 and '69 that led me to believe it was for a continuance of the Pilot Program. Did I misconstrue it or is that correct?

GEN. TARBOX: That is correct, Mr. Poole. The last half of calendar year '68 will have to be paid for with fiscal year 1969 funds, and then after we put some of these methods that we come up with as a result of the Pilot Program into operation, we will want to keep track of them, to make sure that they are coming along as we expect they would. So there will be funds involved in checking up on the methods that we put in operation as a result of the Pilot Program.

But definitely we need fiscal year 1969 funds to complete the Pilot Program by the end of calendar year 1968.

MR. POOLE: I am aware of that. I was just a little intrigued by the figure because it was a million dollars last year and five million dollars this year, and then going up to seven caused me to jump to the conclusion that there might be more Pilot Programs introduced in fiscal '68-69.

GEN. TARBOX: We have no new areas in mind now, Mr. Poole.

MR. POOLE: Thank you.

MR. STEIN: Are there any other comments or questions?

Mr. Poston.

MR. POSTON: I would like to comment that the Federal Water Pollution Control Administration has been cooperating with the Corps of Engineers in these problems of dumping of dredged materials, and I feel that we have made definite progress. We do have much to do yet.

I am hopeful that the cleanup of

waste materials dumped to our water courses, polluted materials, which are really the cause for the problem of transporting dredged materials around, I hope that this conference is successful in eliminating these so that at some future date we will not be concerned with this problem.

I note that the Corps of Engineers does receive payment for dredging or has dredging done for them by certain industries in some of the areas where the industry either pays or has the dredging done of material which they admit that they have deposited in the water courses. I think that this expense of their dredging can be eliminated when they clean up their works.

I was glad to hear General Tarbox indicate that dumping of dredged materials will be such that they will be able to meet the standards. I did note that there will be no dumping of dredged materials in the Chicago area, but that it will be necessary in certain cases of economic need where dredging will be necessary until completion of the

Pilot studies and some other ways of disposal are defined.

Is this correct, then?

GEN. TARBOX: Yes, Mr. Poston. As I mentioned, the District Engineers are visiting each port authority where your agency has determined that there are polluted materials in an area that we have to dredge advising the port authorities of that fact, recommending that even prior to completion of the Pilot Program they try to obtain an alternate disposal area for the 1968 program of maintenance dredging, and if it is located so that it is economically feasible to use it, we will use it during 1968.

Where that cannot be arranged, if a hardship would result if we did not perform that maintenance dredging, we will go ahead and perform it and place the dredged materials in the lake disposal area.

MR. STEIN: Are there any further comments or questions?

Mr. Holmer.

MR. HOLMER: Do we have a list of the communities involved in this list of FWPCA of polluted dredging?

GEN. TARBOX: Yes, sir.

In the State of Wisconsin--

MR. HOLMER: You don't need to start with us.

(Laughter.)

GEN. TARBOX: --Mr. Holmer, if I may start with you, the harbors of which the FWPCA has determined that the material to be dredged under the 1968 maintenance program include Menominee, Green Bay, which is already under the Pilot Program, Manitowoc, Sheboygan, and Milwaukee.

Now, harbors where there is no polluted material--

MR. HOLMER: Incidentally, Menominee is in Michigan. Maybe you meant Marinette?

GEN. TARBOX: O. K., it is Marinette, part of it.

(Laughter.)

MR. HOLMER: All right.

GEN. TARBOX: The project goes under the name of Menominee, but it is--

MR. HOLMER: Because of the river?

GENERAL ROBERT M. TARBOX

GEN. TARBOX: Yes.

Do you care to have the list of unpolluted also?

MR. HOLMER: I would like all of them, General.

GEN. TARBOX: Clean harbors--

MR. HOLMER: No. We know that there are a great many clean harbors in Wisconsin. I would like to know what the others are.

GEN. TARBOX: State of Illinois, Calumet Harbor and River--

MR. STEIN: Pardon me, I didn't get that question, Mr. Holmer. You want to know what the clean harbors are in the other States?

MR. HOLMER: No, the ones that have been identified for polluted dredging.

MR. STEIN: Oh, I see.

GEN. TARBOX: These are in the 1968 maintenance program: Calumet River and Harbor. Then in the State of Indiana: Indiana Harbor. State of Michigan: Muskegan and Manistique.

I am not saying these are the only harbors where there is polluted material. Say these are the ones in the 1968 maintenance program.

MR. STEIN: Any other comments or questions?

MR. POSTON: I would like to ask General Tarbox one other question, and this pertains to a schedule. I feel that for this conference to be a success we will need to come up with a schedule for abatement of all pollution, and I think we will be pushing hard for schedules on municipalities and industries and I feel that the rest of the conferees will be asking me and I will want to know myself:

Would you have any date in mind that we could stop all dumping of dredged materials in Lake Michigan?

GEN. TARBOX: As I mentioned in my presentation, Mr. Poston, I feel that we can meet the date that the FWPCA has recommended for municipalities and we hope to beat that.

Now, aside from the Pilot Program, we have no funds for the increased Federal costs until we can get our needs known in the fiscal year 1970 budget. That is why I say we are going to try to come to some tentative conclusions this fall, even before the completion of the Pilot Program, so that we can eliminate as much of this problem as possible starting in 1969, the latter half of calendar year 1969, and fiscal 1970.

So that with the cooperation of localities, even before then, as you well know, we are starting in 1968, and I think they will add more alternate areas every year and I am confident that we can meet mid-1972. Of course, I have to qualify, that is subject to the availability of funds.

MR. STEIN: Are there any other comments?

MR. MITCHELL: Mr. Chairman, could we get a clarification? Mr. Poston said all dredged materials and I got an indication that the answer was on polluted dredged materials.

MR. POSTON: Polluted dredged materials.

MR. MITCHELL: O. K., thank you.

GEN. TARBOX: That is the way I took your question, Mr. Poston.

MR. POSTON: Yes, polluted dredged materials.

GEN. TARBOX: I am hoping that the conferees will agree, the States will agree, that there is no need to go to alternate disposal areas for dredged materials that are not polluted.

MR. STEIN: This is the question and we appreciate your point of view here, but again let me clarify the question. I don't know that the conferees have ever indicated that they want to make a distinction between so-called polluted dredged materials and any dredged materials. Some people say there is no point in cleaning up Lake Michigan if you are going to use it as a dump. And the next question that you have is where do you draw a distinction.

As I pointed out, we have a view from the Fish and Wildlife people that if you take any material, no matter how pure it might be or what you would ordinarily call clean rock, and strew it on the bottom, you may be changing the ecology of the area, and I am not sure that these people are in favor of doing this.

The questions to be resolved are, one, whether we are going to permit the Great Lakes to be used for the disposal of any dredged material, and two, whether we are going to confine that to so-called "polluted" dredged material. I think we are all in agreement on that. As I understood the agreement between the Department of Interior and the Corps of Engineers there is a prohibition now against disposal of that kind of material in all the Great Lakes, not just around the Chicago area.

So I think most of these issues are resolved except that first one that Mr. Mitchell raised, which is still an open question, of how far the prohibition on disposal of dredged spoils should obtain.

Again I am trying to state the facts of the case and the determinations as I see it. I know of no official body that has made a conclusion we are just dealing with, quote, polluted dredged material. Obviously, General, when any determinations are made, you will follow them out, follow the policy. But I think they are still working on that one.

Are there any other comments or questions?

There is one point that was possibly skirted over in Mr. Poston's remarks. The General mentioned this (page 1211) in his statement. I think this is a critical one that we, the Corps, the other public agencies, the States, and the industries have to face.

Page 1211 he points out, "To give you an idea of the size of the problem, the amount taken from the Calumet Harbor and channel would fill the Bal Tabarin Room 30 times over each year." Also "We dredged over one million cubic yards of spoil from the outer harbor and the Cuyahoga River at Cleveland"--and if any of you have been on the Cuyahoga River, you know that is not a pristine pure mountain stream--"the amount would cover a city block of Cleveland about 150 feet deep."

The question is, why do we have to

get rid of the dredged material? And I think the Corps is under a statutory obligation to maintain these channels. Obviously if we didn't have these channels and we couldn't maintain shipping we would have a tremendous detriment to our interstate commerce.

But how do these channels get what? Where is the material coming from? The material is coming from precisely those industries that have the Federal Water Pollution Control Administration, the States, and the Corps of Engineers striving with the difficult problem of maintaining the channel so they can get the boats or ships up to their dock to bring in their raw materials and put out their finished product. And I think the General mentioned that the problem will be greatly reduced as communities and industries effect a better treatment of their wastes.

It seems to me we have enough problems in pollution control, and this is the question that everyone asks--that the best way to prevent pollution is to prevent this at the source. And a lot of people are saying this whole controversy doesn't make sense because what we are doing is we should stop that pollutant from getting in there in the first place and then the problem will be minimized. And I think this is what we have to keep our eye on.

(Applause.)

Are there any further comments or questions?

Thank you very much.

GEN. TARBOX: Thank you, Mr. Chairman.

(Applause.)

MR. STEIN: At the behest of the conferees making the statements, we will forego any recess this morning and we will try to go through right to 12:30.

Again let me point this out, I have asked that those curtains be opened in the rear of the room. Once you get behind that curtain, whether they are open or not, they are not soundproof. If you are going to caucus, go out into the hall. I know there is a psychological notion that once you step beyond those curtains you are in another room. You are making the hearing very, very difficult for the people in the conference room if you keep

ILLINOIS PRESENTATION (CONTINUED)

that hubbub there. I ask you to bear with us on this.

Mr. Klassen.

ILLINOIS PRESENTATION (CONTINUED)

MR. KLASSEN: Mr. Chairman, to continue with the Illinois Presentations, I know we all recognize that one of the vital parts of cleaning up Lake Michigan is the legal aspect and the co-operation that each of the States will receive from their Attorney General. Illinois has this cooperation, and the man responsible for this is our next speaker, William G. Clark, the Attorney General of the State of Illinois.

(Applause.)

STATEMENT BY THE HONORABLE WILLIAM G. CLARK
ATTORNEY GENERAL
STATE OF ILLINOIS

MR. CLARK: Thank you, Mr. Chairman. Ladies and gentlemen.

Not too many years ago, Illinois coal miners put canaries in cages and carried them below ground to detect dangerous and sometimes lethal fumes.

Today we have gone below the surface of our waterways and have detected poisons just as dangerous and just as lethal as those deadly vapors of the mine pits. This is pollution, the insidious cancer that threatens the lifespan of our lake and the health of our people.

In convening this conference, Secretary Udall and Governor Kerner have set in motion a meaningful effort to mobilize the power of four States and the Federal Government into a single pollution-fighting force.

Like advanced cancer, pollution has

progressed so far that the only solution is some radical surgery.

I call on every Federal agency concerned with public health, conservation and economic development and on every State agency, municipal and county authority concerned with protecting public health to make Illinois a no-quarter battleground against pollution, from the Mississippi River to the Wabash, from Cairo to Galena.

I ask for a radical surgery policy on the part of every agency.

As the officer charged with enforcing the anti-pollution laws of Illinois in the courts, I will take determined action. We will sue anybody who is certified to us by the Sanitary Water Board as a violator. We will sue everybody so certified where a suit will serve the public interest and expedite corrective actions. There will be no exceptions.

Where penalties or damages are asked and where there is evidence of disregard for the public interest, we will seek maximum monetary judgments in the courts.

WILLIAM G. CLARK

I recommend that the Legislature, without delay, give Mr. Clarence Klassen and the Sanitary Water Board any amount of money and additional number of investigators and engineers that he needs to do the job of policing Illinois waters now--right now--not two or five or six years from now!

I think it is outrageous to expect the Board and Mr. Klassen, with a staff of only 54 and annual appropriations of some $518,000, to police adequately many hundreds of miles of waterways, some 1,000 lakes and reservoirs, 10,000 industrial plants, and the sewage operations of hundreds more municipalities and public agencies.

The Legislature must act to give Mr. Klassen the muscle he needs to do the job.

The dialogue here in the last three days has told us much, and it is encouraging to us.

Watercraft in Chicago harbors can no longer flush unseen wastes. We are promised determined enforcement.

The dumping of dredged materials

into the lake has been sharply restricted.

Timetables have been set for pollution abatement by offending industries and municipal agencies. We are holding a stopwatch on them.

Water quality standards have been raised to safe levels.

The Attorneys General of the four lake States are exchanging lists of known polluters within their own States. They are committed to obtain compliance.

The question that concerns us most today is not so much what can be done, but how soon we can accomplish it.

There is, therefore, no time for guesswork, only hard work and fast work. The public, the press and Federal and State Governments share the belief that the greatest danger at this hour is the danger of delay, of paralysis by analysis.

I have a great fear though, a great fear that in concentrating our massed firepower on Lake Michigan we may give a distorted impression that pollution stops at the shoreline, and thus there is no real cause for concern anywhere else in the State of Illinois.

I am aware that many downstate Illinoisans regard water pollution as the private and exclusive problem of their neighbors along the distant lakeshore. This kind of myopia could lose the war on pollution in Illinois.

Let me invite your attention to this map which we have here behind me. Each of these dots represents a pollution problem so severe in the State of Illinois that sustained legal action by my office was required and was taken in cooperation with the State Sanitary Water Board to prevent the further infection of a waterway.

Let me now read to you one of the most frightening assessments of the downstate pollution problem on record. On page 161 of this official State of Illinois document, which I am holding in my hand, which is the latest and most knowledgeable analysis of our water problems, called "Water for Illinois, A Plan for Action," there is the chilling statement that because of bacterial pollution, "swimming or water skiing in any of the streams and rivers of Illinois is not recommended."

Please think about that for a moment. Because of bacterial content, it is recommended in an official State document that we do not swim in any Illinois river or stream.

Just one year ago, the Federal Water Control Administration completed its assessment of pollution damage to our waterways during the preceding year. It was found that in Illinois, more than 800,000 fish died from the direct effects of pollution. Our State was, in fact, the fifth largest killer of fish in the Nation that year.

The fish cannot survive in Illinois rivers and if we cannot swim in them, how far away is disaster?

My point is simply this: If we are going to end pollution, we must end it from border to border and from shoreline to county line, otherwise we leave the cancer unchecked in many parts of our corporate body.

I hope that every Illinoisan will have a chance to see this map that I have here with me today to see for himself that the cancer of pollution is spread throughout the entire body of the State of Illinois.

Mr. Klassen and his too-limited staff have fought a constant, and consistent fight and often a lonely fight against pollution and always against odds. We know, because we have been his legal ally these past seven years. Illinois would be in chaos today if police and law enforcement had to face such impossible odds.

I am convinced that pollution in downstate Illinois is now intolerably widespread. To put it plainly, Mr. Klassen has been ordered to wage a war without troops.

Of equal priority in this anti-pollution campaign is the need for a Pollution Litigation Division in the office of the Attorney General of the State of Illinois. I have twice asked and twice failed to receive from the Legislature funds for this purpose.

I will, therefore, go a third time to the Legislature on March 4 to attempt to fill this most apparent need.

In the meantime, two Assistant Attorneys General, Mr. Morrow in Springfield and Mr. Barth in Chicago, are, on a part-time basis, attending hearings and filing lawsuits in both air and water pollution cases. Because of staff limitations, they cannot presently be assigned to full-time pollution enforcement. I wish they could!

The law itself contains penalty provisions adequate to deal with pollution in Illinois at either the civil or criminal level.

Under the pollution statutes. the courts may fine individuals or industries, cities or sanitary districts $500 for the first day of a violation and $100 per day for each day of violation thereafter.

Under the Illinois criminal code, fines up to $1,000 or a year in jail or both can be assessed for reckless conduct involving public safety. Finally, there is also the restraint of court injunction.

At the same time that we proceed against polluters, we will apply the Rule of Reason to those with honest difficulties. In many cases, lawsuits do not provide solutions.

In Williamson County, Illinois, for example, a pollution suit proved to be an exercise in futility. The offending community of Carterville, Illinois, was bankrupt. There was no money to correct the pollution problem in the first place. Of what value, then, is a penalty judgment, I ask you?

In Cass County in Central Illinois we were asked to sue a village which had failed to comply with orders of the Sanitary Water Board. The voters twice rejected bond issues to correct a faulty sewage system. Ultimately, with the promise of a $250,000 Federal assistance grant, the voters consented to remedy the situation. We were requested, and happily agreed, to defer legal action in the face of one particularly overwhelming fact: By the time the sewage facilities were completed, the village would have been liable for $365,000 in penalties, or $115,000 more than the total Federal grant. Case closed.

We do not find within the Rule of

WILLIAM G. CLARK

Reason, however, the occasional threat of an industry to pack up its jobs and equipment and leave Illinois if anti-pollution laws are enforced against the company. We don't want to lose any industry. But presented with such ultimatums, we are going to stand with the statutes of the State of Illinois.

And I would like to remind such industries that there is no longer any haven from pollution prosecution. Federal anti-pollution enforcement reaches to every sector of the Nation and that enforcement is constantly increasing.

The Rule of Reason is serving, and serving well, the four States involved in this conference. After 50 years of quarrelsome litigation over the amount of water Illinois diverts from Lake Michigan, the dispute ended last year with the amount of diversion unchanged. Illinois neighboring States were our adversaries during much of that half-century of litigation.

But on November 3, 1967, we became allies. On that date Attorneys General Frank Kelley of Michigan, Bronson LaFollette of Wisconsin, and John Dillon of Indiana met with me in my offices in Chicago to prepare a cooperative regional campaign against pollution violators irrespective of State lines or the special interests of any single State.

As our first point of agreement, we resolved not to repeat the mistakes of the past, filing suits and countersuits against each other, State against State.

Instead, we have exchanged lists of all known polluters of Lake Michigan from within each State as prepared and presented to us by our State experts. We are now prepared to file lawsuits individually or to mass the combined powers of the four States through the offices of the Attorneys General with all four Attorneys General acting as joint plaintiffs.

Thus, through the Rule of Reason, the attack upon pollution is now both regional and cooperative, a far step ahead of the divisive quarrels of the past.

I feel that we are making significant strides at both the State and regional levels.

Certainly the added impact of the Federal Government gives far greater force to our efforts.

I am personally convinced we will ultimately win the war against pollution. Next November Illinois voters will be asked to approve a one billion dollar bond issue to finance a massive attack on both air and water pollution.

This can be the main offensive in the Illinois pollution war. I endorse this proposal with the greatest enthusiasm and conviction. This program will give us all we need, all the weaponry required for the war we wage.

Every dollar of this money will be used to benefit every Illinoisan by erasing the peril that hangs in our air and swirls through our waterways.

The question is not, "Can we afford to do it." The question is, "Can we afford not to do it?"

The victory we seek over pollution will not come overnight, but I am certain that it will come because of the involvement and total commitment of men like Secretary Udall, Governor Kerner, Mayor Daley, Clarence Klassen, Peter Kuh and Ted Rogowski of the Department of Interior, Murray Stein and H. W. Poston of the Federal Water Pollution Control Administration, and all of the other people that we have been meeting with. They are men of dedication and they are determined to win a victory against pollution. It must be a victory that is total in every part of Illinois and certainly in every part of the four States bordering Lake Michigan.

Thank you.

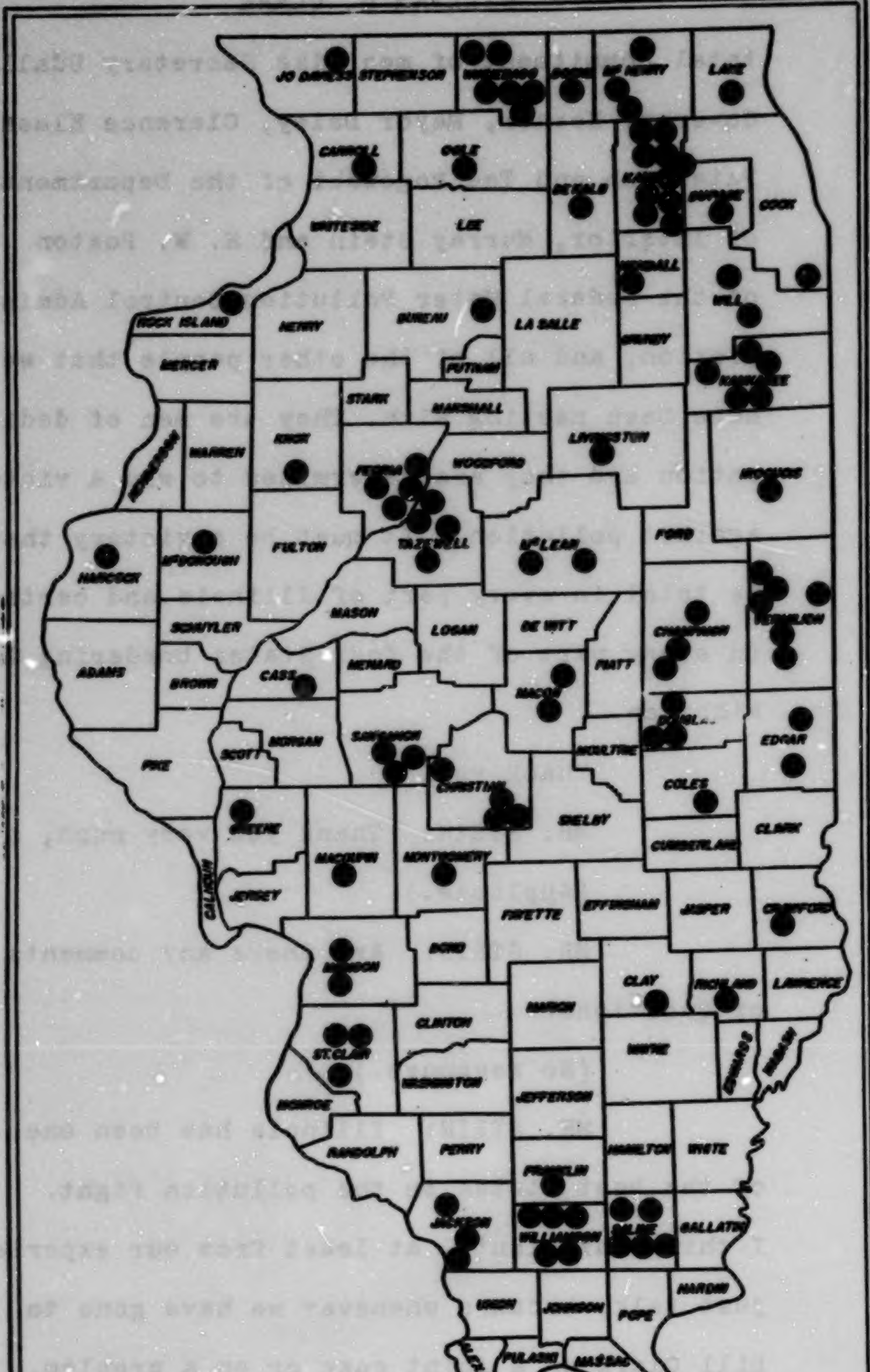
MR. STEIN: Thank you very much, sir.

(Applause.)

MR. STEIN: Are there any comments or questions?

(No response.)

MR. STEIN: Illinois has been one of the best States in the pollution fight. I think this isn't, at least from our experience, just talk, because whenever we have gone to Bill Clark on a joint case or on a problem, his hand has always been out; the full


JO DAVIESS
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ROCK ISLAND
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facilities of his office have been available, and we have moved ahead.

I have one question and one slight comment.

Under the Federal law, as you know, we give the States the first crack to proceed against the polluters under their own laws of procedures. Now, when the Attorneys General of the four States met and your program was set up, did you have the same kind of procedure, that each one of you was going to get the first crack at your own polluters, or were you going around suing polluters in other States?

ATTORNEY GENERAL CLARK: We agreed that we each would ask the experts in our State for the list of polluters and then we would exchange lists so that we would each have a check on the other. Once having done that, we were going to have a further meeting to decide if each of us should individually sue those within our State or whether the four should join in every suit. In any event, each advocate would have a complete list of the polluters in all four States of Lake Michigan and each would be a check on the other.

And I think that arrangement, Mr. Stein, makes a great deal of sense, because we had just gone through the lake diversion cases--Mr. Kuh was working on that long before I was Attorney General, I know--and for some 50 years the lake States fought this battle. And after millions of dollars and 50 years later, it was finally resolved. That could have been resolved 50 years ago.

And so I called the Attorneys General of the States and said that rather than each of us suing each other and 50 years from now the Supreme Court of the United States would find that each of us had within our State pollution problems, let's all agree right now that we have it; let's assume the Supreme Court has just entered the decree, and let's start out from there.

So as a result, we have complete cooperation of the Attorneys General of those States. I met with two of them in Washington yesterday. They are all either going to be here or present papers to you. And we would like the opportunity, of course, to be able to do this on a Statewide basis with your continuing help and expertise.

MR. STEIN: Right. And I think we are in full agreement on that.

There is one more point, and this is one I want to put out in passing, particularly for Mr. Klassen.

I think all the States here have good programs, but when foreign visitors come and they want to look at a good program, we say, "Why don't you go out to Illinois?" And then we get this other figure that you mentioned that you have the fifth largest fish kill statistics in the country.

This is the paradox in pollution control. In a Federal enforcement operation like this you will often find with the most progressive States, such as Illinois, with the fifth largest fish kill--and I am sure this is a very serious problem--that the question you have to ask is how much can this be attributed to the full reporting system and candor of Illinois in sending in the statistics.

Very often you will find that the States who are doing a good job in outlining what the pollution problems are, spotlighting cities and industries so that everyone thinks there is a tremendous pollution problem are really the States that are being alert, finding pollution problems where they are, and identifying them so they can meet them.

Thank you very much.

ATTORNEY GENERAL CLARK: Thank you, Mr. Stein.

MR. STEIN: Mr. Klassen.

MR. KLASSEN: The Department of Public Works of the State of Illinois has in office concurrently a man of many parts. He is a member of the Illinois Sanitary Water Board and we want to hear from him now, particularly because he is the person that signs and authorizes any permits for dumping into Lake Michigan.

FRANCIS S. LORENZ

At this time we want to present Francis S. Lorenz, Director of Public Works of the State of Illinois.

STATEMENT BY FRANCIS S. LORENZ
DIRECTOR, DEPARTMENT OF
PUBLIC WORKS AND BUILDINGS
STATE OF ILLINOIS

MR. LORENZ: Thank you very much, Clarence.

Mr. Chairman, State and Federal conferees, distinguished guests and ladies and gentlemen of the conference.

The Department of Public Works and Buildings is one of several Illinois agencies which exercises jurisdiction over aspects of the use and study of Lake Michigan. Responsibilities which rest with this Department of State Government concerning Lake Michigan include acting as trustee for the people of Illinois who own the bed of the lake, cooperating with Federal and State agencies and making surveys and reports in relation to the levels of

Lake Michigan, execution of permit powers for construction of works in the waters of the lake, and more recently, the allocation of water supplies from Lake Michigan to both government and private entities.

Other Departments of State government have proper and appropriate jurisdiction over water pollution, water recreation, and fishing and wildlife aspects of the lake. The City of Chicago, the Metropolitan Sanitary District, the North Shore Sanitary District and numerous local units of government have responsibilities for their geographical boundaries and functional purposes.

The wide variety of jurisdictions in Illinois is duplicated in Wisconsin, Indiana and Michigan to the end that hundreds of governmental jurisdictions have responsibilities for aspects of the Lake Michigan resource. Often times, particularly when State lines are crossed, conflicts develop between the aims and capabilities of the several agencies. The conflicts involve criteria of judgment such as water quality standards, and requirements of economic enhancement, such as the maintenance of deep-draft harbors and waterways.

There have been many reasons set forth relative to the causes of pollution in Lake Michigan and other problems which may be hastening the degradation of the deep waters of the lake. One of the activities which has received considerable public attention is the possible discharge of polluted material in the disposal grounds on the bed of the lake. In the State of Illinois utilization of the official disposal grounds may be accomplished only upon issuance of a permit by the Department of Public Works and Buildings of the State of Illinois.

The Department of Public Works and Buildings completely endorses strict control over the discharge of any material to Lake Michigan waters and believes the discharge of any material which would pollute the waters of our great resource should be totally and finally prohibited. Several actions have been undertaken to enforce this position of the Department.

At the present time a strict embargo on the basis of an Executive Order issued by Governor Otto Kerner prevents the deposit of any material in Lake Michigan for either off-shore disposal purposes or for the construction of additions to beaches, groins, or breakwater protections. The purpose of this embargo is to place the State of Illinois in an absolutely certain position relative to the adoption of strict and appropriate quality criteria for permissive placement of inorganic materials in Lake Michigan.

In addition to the Executive Order which defines the present posture of the Department, through the strong leadership of Governor Kerner and the admirable bipartisan action of the General Assembly of Illinois, new measures have been enacted into law to aid in the preservation of the water quality of Lake Michigan. The legislation requires that the Department of Public Works and Buildings issue permits for the disposal of material in Lake Michigan only after certification has been made by the Sanitary Water Board of the State of Illinois as to the acceptability of the material in the lake waters from the standpoint of water quality. In addition, the bill specifically requires that the Sanitary Water Board undertake studies and work in close cooperation with units of local government to ensure adequate waters for swimming on public beaches in the Chicago area, to provide absolute control of waste discharge from vessels moving on the lake in Illinois, and to satisfy the requirements set forth by the State conferees which were convened for the purpose of controlling the pollution of shore waters of Lake Michigan. This strong bipartisan measure was presented to Governor Kerner at a special session of the General Assembly. This law became effective on October 30, 1967.

The measures will cost the State of Illinois virtually no monies, but will effectively close the door to contamination of the waters of Lake Michigan by the use of the offshore disposal grounds because of the dumping of dredgings originating in Illinois rivers and harbors.

I call your attention to the fact that if this action by Illinois is a unilateral one the lake will not be benefited. The dumping of pollutants knows no boundary, just as the water of the lake knows no boundary. We agree that the pollution caused by the use of the disposal grounds, even if polluted material is discharged, is small. But the important fact is that this is a degree of pollution that can be completely eliminated. Illinois has taken the unilateral action to set the example! Elimination of this clearly visible, repugnant use of the waters of Lake Michigan is a necessity to our eventual control of the pollution problem. It is our belief that you conferees should urge the other States to this conference to become equally as tough as Illinois now is.

The two main problems of pollution in Lake Michigan will require more time and much more money for an effective solution. It is our opinion that there is no way to acquire the desirable degree of protection without the expenditure of great sums of money and this fact should be thoroughly recognized by all concerned. It is the considered opinion of the Department that it is erroneous and wasteful to attempt the control of Lake Michigan water quality by concentrating upon isolated aspects of the total pollution problem. The membership of this conference must be aware of the tremendous problems which face the States bordering upon the Great Lakes. From the standpoint of both economic impact and water quality control, it is our opinion that the two most serious problems relative to pollution of Lake Michigan may be arranged in the following order:

a. The inflow of nutrients in the form of phosphates and nitrates from agricultural land and from sewage treatment facilities. The extremely critical nature of this problem is apparent from two considerations. First, we do not know how to control the inflow of nutrients to Lake Michigan, and secondly, we have no means of controlling the impact of the nutrients on the ecology of the lake.

b. The second area of concern has to do with discharge of domestic and industrial wastes into the peripheral waters of Lake Michigan. We view this problem with less concern than the first only because we have the means, both technically and financially, to control this source of pollution. We have the water quality standards and in Illinois we have the law to support the standards. Satisfaction of the requirements will not be easy, and it will be expensive, but it must be done to protect the health and wealth of all those served by Lake Michigan. The work will be done in the field by industry, by officials of government and by all our citizens. It will be the result of long, hard, painstaking, professional work.

Let me state here that we deeply appreciate the sincere help of the press and other news media in this regard. Their efforts in making the public aware of the problem have been outstanding. In addition the responsibilities already cited the Department of Public Works and Buildings is responsible for the regular surveillance of the shores of Lake Michigan to ensure that the interests of the people of Illinois are protected. In conjunction with this work we have completed numerous studies of the currents and waves of Lake Michigan as well as of the problems of shore erosion and accretion. Several reports have been published as the result of these studies and are generally available to the public.

In closing, Mr. Chairman, let me assure you, and all others in attendance at this conference, of the complete cooperation of the Department of Public Works and Buildings as we move forward with this great task. Directions to me from the Honorable Otto Kerner, Governor of the State of Illinois, emphasize his great and specific interests in the utilization of the waters of Lake Michigan. Directions by me to the professional units of my Department will assure that every possible degree of cooperation is afforded by the Department of Public Works and Buildings to each and every agency interested in working toward the final development of the Lake Michigan resource.

And let me say finally in closing, I hope that the efforts of the State of Illinois in this regard will not go unnoticed by the other States to this conference, that we have got to work together and not be in competition with each other, and that if there is going to be any banning of the dumping of dredged materials in the lake we should all follow the strongest possible course in this regard.

Thank you very much.

MR. STEIN: Thank you, Mr. Lorenz.

(Applause.)

MR. STEIN: Are there any comments or questions?

Again I would like to compliment Mr. Lorenz on his statement and indicate that the problem in dealing with the disposal of dredged material has not been a simple one. As you can tell, it is still not completely resolved.

Again, in working with Mr. Lorenz, we have had the fullest cooperation throughout a very sticky Federal-State-local problem. If we had more people like him everywhere, with his attitude, flexibility and complete knowledge of the field, we could move way ahead. That is the kind of cooperation, give and take and full candor we have had from Mr. Lorenz and the Illinois group. I am sure if we get this from all parties who are concerned with the disposal of dredged materials, we will have a satisfactory solution.

Thank you.

MR. LORENZ: Thank you very much.

MR. STEIN: Mr. Klassen.

MR. KLASSEN: Mr. Chairman, to continue, the Director of the Department of Conservation of the State of Illinois likewise has many hats. He is a member of the Illinois Sanitary Water Board and, of course, is the person that is deeply involved in fish and recreation involving Lake Michigan.

At this time I would like to present the Director of the Department of Conservation, William T. Lodge.

STATEMENT BY WILLIAM T. LODGE
DIRECTOR, DEPARTMENT OF CONSERVATION
STATE OF ILLINOIS

MR. LODGE: Mr. Chairman, conferees, ladies and gentlemen.

The boundaries and jurisdiction of the State of Illinois are defined in Article I of the State Constitution. This gives the Illinois Department of Conservation the responsibility of carrying out statutory regulations for fish, game and boating for over 976,000 acres of water in Lake Michigan. At the present time, even with this large acreage of water, there is only a small area of recreational activity primarily located close to the 63 miles of Lake Michigan shoreline in Illinois. With the quest for quality in Lake Michigan water, there will be a change to using increasingly greater amount of the lake offshore rather than just near the shoreline. It indeed is important to have for the future a well-managed lake with clean water to provide a large potential area of interest to people ready and available for recreational fishing, boating and other allied outdoor activities.

Our Department exercises concurrent jurisdiction with the Federal Government and various political subdivisions of the State with regard to enforcing the provisions of the Illinois Boat Registration and Safety Act and providing boating facilities on that area of Lake Michigan alluded to previously. The State of Illinois has direct jurisdiction over only about three miles of its lakeshore on Lake Michigan. The entire remainder of the lakeshore in Illinois is either in private ownership or is under the direct control and supervision of various park districts and municipalities within which the shoreline lies.

The purpose of the boat law is to provide persons with a safe and enjoyable boating environment and to provide boating facilities throughout the State. It is anticipated by the year 2000 there will be five times the number of boaters using the waters of our State as are presently doing so.

One of the main deterrents to providing quality water recreational activities in the State is the rising pollution levels along lower Lake Michigan. It is incumbent upon us to keep abreast of these problems in facing the necessities of the future in recreational boating. We must attack the problems of water pollution on all fronts. Pollution from pleasure boating is not considered to be extremely serious at this time as compared with other sources of water pollution. However, this is a definite type of pollution which can and must be eliminated.

The City of Chicago has recently taken the lead in establishing regulations for pleasure boats which will eliminate this problem. The State of Illinois will undoubtedly follow this lead in the near future, and it is hoped that other States bordering on Lake Michigan will cooperate in this type of regulation for the elimination of this pollution.

Due to the availability of marine fuel tax funds, it is anticipated that our Department will, in the future, be in a better position to create more and better harbor facilities on Lake Michigan. Our Department should increase facilities for water-related recreation through State and Federal assistance to local governments in developing additional public harbors, mooring facilities and harbors of refuge.

Sport fishing in Lake Michigan in Illinois waters has centered primarily around fishing for yellow perch off piers and breakwaters. Gill netting, seining and dip netting for smelt has been another recreational type fishery in the spring of each year. A limited amount of fishing for other species such as rock bass and carp has occurred around breakwaters in some of the boat harbors and lagoons especially in the Chicago area. Because of the changes in the yellow perch population in the lake, the fishing for this species has fallen off drastically. Smelt fishing has severely declined and the catch of herring is virtually absent. There has been a corresponding decline in the number of fishermen using Lake Michigan in Illinois waters as depicted in the fishing license sales. The combined total number of fishing licenses sold in Cook and Lake Counties has dropped from 300,000 in 1957 to about 170,000 in 1965.

During the past 12 years the alewife population in Lake Michigan has expanded at a rapid rate with a peak population being especially evident in Illinois waters in 1966 and 1967. This great abundance of alewives has followed with massive die-offs of this species especially during the summer of 1967. The concentrations of the greatest number of dead fish were generally along the entire shoreline of Lake Michigan, but especially heavy accumulations occurred in lower Lake Michigan. Serious problems connected with disposal of these fish were presented to all beach and shoreline areas. Also there are serious problems to water intakes being clogged with this overabundant fish. A coordinated plan to meet the problem of alewife die-offs is now underway and a long range plan to prevent such occurrences is a major project of the Great Lakes Basin Commission. Private, City, county, State and Federal agencies will be a part of this needed work which is underway at the present time.

In Illinois no commercial fishing is done for the alewife and it is not a fish that can be taken on hook and line. The unfortunate feature of the alewife explosion from a fisheries standpoint is that it has crowded out some of the more important fishes of southern Lake Michigan such as herring, yellow perch and chubs. The number of commercial fishermen operating out of Illinois ports on Lake Michigan has become greatly reduced over the past 20 years. Part of this has been because of low income gains compared to investment, and part of it is due to a reduction in availability of marketable fishes. The commercial fishing industry in Illinois waters of Lake Michigan from 1945 to 1955 changed from a perch-lake trout to a perch-chub fishery. From 1956 to the present time the change has been from a perch-herring-chub fishery to one dependent almost exclusively on the chubs. At the present time there are only three full-time boats fishing commercially out of Illinois ports plus six part-time boats (all gill net operators). No fishermen in Illinois have yet made the expensive conversion of equipment to trawl for alewives. At the present time commercial fishing is closed for lake trout, coho and chinook salmon in Illinois waters.

While the above conditions of fisheries in Lake Michigan possibly cannot be directly related to lake pollution, they do point up a problem which has arisen in the lake of an imbalance of marine life which must be corrected. The correction of this problem will undoubtedly be greatly facilitated by the attaining of water quality good enough so as to not pose an additional problem to the development of the habitat.

WILLIAM T. LODGE

The Great Lakes Fishery Commission working with the U. S. Department of the Interior has been and will continue to be particularly interested in work to improve the structure of the fish population. This active program is in cooperation with States bordering the lake. The lake trout program of the Great Lakes Fishery Commission and the recent salmon introduction of the State of Michigan may well be the lead into an important specialized offshore sport, troll fishing in all areas of Lake Michigan and especially in Illinois waters.

MR. STEIN: Thank you, sir.

Are there any comments or questions of Mr. Lodge?

Thank you very much for your statement.

Mr. Klassen.

MR. KLASSEN: Normally, Mr. Chairman, we would get back and finish up the Chicago Water Department presentation. The technical part of this is quite lengthy and involved, and we are going to defer this until the time right after lunch and hope now for the 12:30 time for lunch I understand the Chairman has imposed, which is good. We want to pick up a few short ones.

Responsible for much of the water pollution activities in our State Legislature is the Commission on Water Pollution and Water Resources.

I am going to call on the Chairman of that Commission at this time--with a certain risk, being a State employee, having to tell the Chairman of an important committee like this that he has only three minutes--Carl Klein, Representative of the Chicago area.

STATEMENT BY REPRESENTATIVE CARL L. KLEIN
CHAIRMAN, WATER POLLUTION AND
WATER RESOURCES COMMISSION
STATE OF ILLINOIS

MR. KLEIN: Thank you, Mr. Klassen. My staff is passing out my statement and a report on Lake Michigan from the Water Pollution and Water Resources Commission of the State of

Illinois.

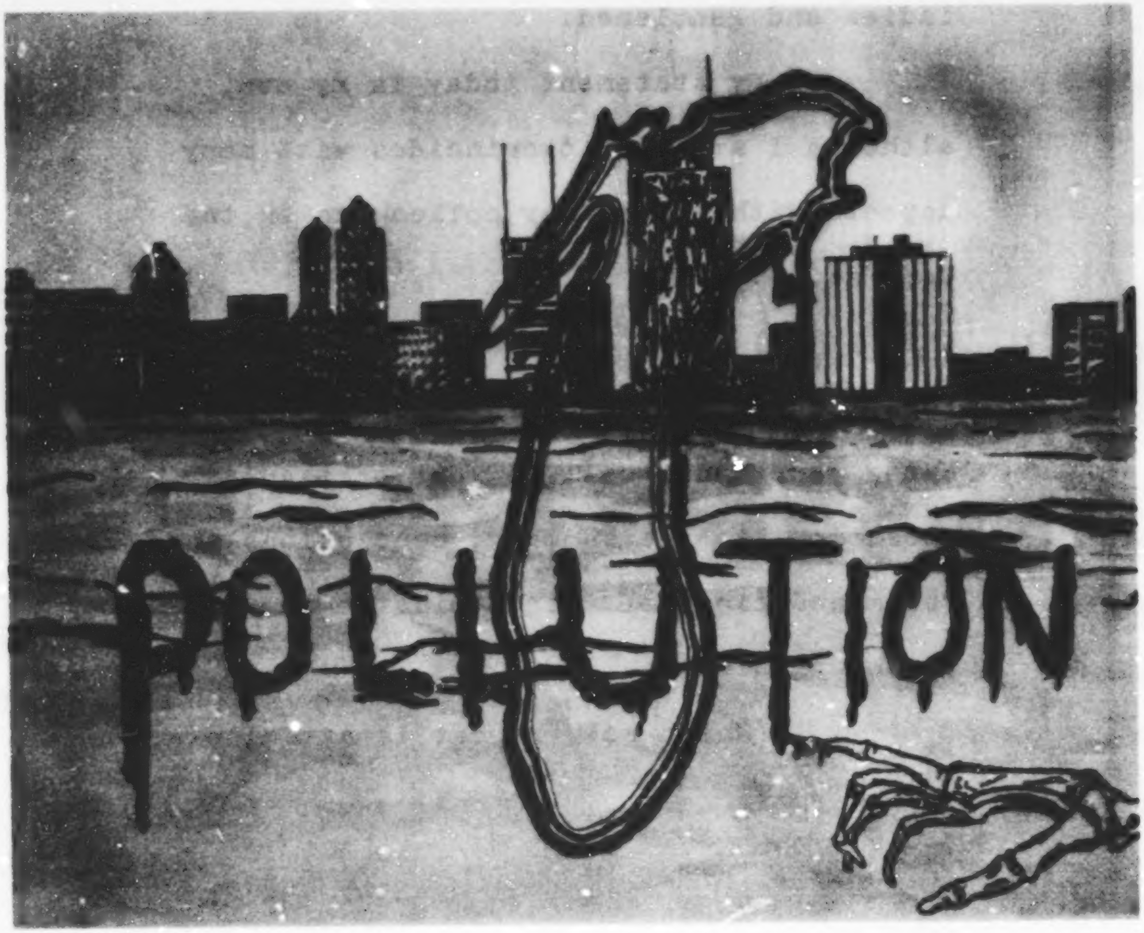
Mr. Chairman, honored guests and ladies and gentlemen.

My statement today is my own, although I am sure it coincides with many aspects with that of my colleagues on the Commission.

I state to you that the Commission report on Lake Michigan is now being distributed among you, and I call to your particular attention, to the summary, conclusions and recommendations of the Commission in regard to the problems.

(Which said report is as follows:)

Report on Lake Michigan



Water Pollution and Water Resources Commission of Illinois

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Prof. Harold Gotaas

THE MOVING FINGER WRITES; AND, HAVING WRIT,
MOVES ON: NOR ALL YOUR PIETY NOR WIT
SHALL LURE IT BACK TO CANCEL HALF A LINE,
NOR ALL YOUR TEARS WASH OUT A WORD OF IT.

AND THE MOVING FINGER HAS WRIT: ON LAKE MICHIGAN

Pulp sugars....
Canning sugars....
Kerosene...
Salt Water...
Garbage dump...
Coal dust...
Oil and paints...
Dieldrin...
Septic overflow...
Drug remnants...
Sulphuric acid...
Oil and grease...
Flue dust...
Shipping discharges...
Bathing pollution...
Sport boating discharges...
Dumping of dredgings...
Landfill operations...
Plankton...
Raw sewage...
Partially treated sewage...
Phosphates - Nitrates...
Alluvials...
Farm fertilizers....
Cattle and hog lot flushings...
Thermal pollutions...

ALGAE, ALGAE EVERYWHERE AND NOT A PLACE TO SWIM —

HOW LONG WILL THE LAKE STAY FIT TO DRINK?

WATER POLLUTION [illegible] URCES COMMISSION

AUG. 26th 1818

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From the Office of the Chairman:
STATE REPRESENTATIVE CARL L. KLEIN
6420 South Francisco Avenue
Chicago, Illinois 60629

January 25, 1968

His Excellency Otto Kerner
Governor, State of Illinois
and
Members of the 75th General Assembly:

The Water Pollution and Water Resources Commission, created by House Bill No. 1059 during the 1965 General Assembly, herewith submits its supplemental report concerning Lake Michigan based on its hearings in the area.

We trust the results of our additional studies will be helpful as a guide to the State of Illinois and its communities in determining their forward progress in the field of water use and water resources, especially insofar as Lake Michigan problems are concerned.

Respectfully submitted,

WATER POLLUTION AND WATER
RESOURCES COMMISSION

Carl L. Klein

CARL L. KLEIN, CHAIRMAN

BACKGROUND

Basically, the southern portion of Lake Michigan is without regular currents.

When the Lake is calm and windless, probably the only discernable movement is a littoral one southward along both the East and West shores bringing nutrient and industrial pollution from Michigan and Indiana into the Calumet River, and from Wisconsin and Lake County, Illinois into the Chicago River; both littoral flwws being induced by the water diversion from Lake Michigan into the Illinois waterway.

When the Lake is beset by wind and wave, currents may run clockwise or counterclockwise depending on the direction of the wind; then sands shift in the current and the pollution in the water is distributed from one location to another spot, which may also be a source of pollution.

The inactive quality of Lake Michigan waters is the greatest threat to its continued well-being. While running water cleanses itself of pollution by bacterial action and renewed oxygenation, pollution introduced into Lake Michigan just lays there dormant and becomes greater day by day, week by week, month by month, and year by year.

Pollution in the Lake is more probably similarized to cancer -- the danger is probably in a geometrical progression rather than arithmetical. As with cancer, the need is to recognize the early symptoms of pollution and to take heroic steps to cure it even to the point of amputation, because the welfare of Illinois, Indiana and Wisconsin are largely based on Lake Michigan as source of pure domestic water and plentiful industrial water.

MICHIGAN:

The sweep around the Lake should start with the sovereign State of Michigan.

The State of Michigan presents the least industrialized face toward Lake Michigan -- but even here, the hand of man changing the forest into farm and orchard, using fertilizers, herbicides and pesticides, setting up canneries, processing salt, using kerosene, and building cities, villages and towns with inadequate sewage treatment and inadequate horse-and-buggy septic tanks has brought pollution into the streams and into Lake Michigan.

WISCONSIN:

Our sister State of Wisconsin is more industrialized -- in the Fox River Valley and Green Bay, at Manitowoc, Sheboygan and the Milwaukee--Racine--Kenosha complex, Extreme industrial pollution in the Fox River Valley empties into Green Bay; pulp processing and dumping of polluted dredgings and inadequate sewage treatment makes the picture of Green Bay gloomier every day.

Wisconsin rivers emptying into Lake Michigan bring herbicides, pesticides, fertilizers, feed lot pollution, untreated or inadequately treated sewage into Lake Michigan.

The Milwaukee complex problem bring unregulated industrial pollution into the Lake -- but even more important, the large populations dependent on the industries cause more important problems -- untreated raw sewage, inadequately treated sewage, and nutrient pollution by phosphates and nitrates from efficiently treated sewage.

INDIANA:

The sovereign State of Indiana is highly industrialized on its most important frontage on Lake Michigan.

Steel mills bring flue dust, and also cause thermal pollution from heated waters; oil processing causes thermal pollution and careless handling in tankers or processing brings oil slicks and tainted dredgings; other industries contribute many other forms of pollution to the overburdened waters of the Lake.

The lakeside cities of Gary, Hammond, Whiting, and East Chicago, fortunately have sewage relief through the Illinois Waterway or the situation would be unbearable.

However, Indiana farmlands and feedlots contribute their share of fertilizer, herbicide, pesticide and feeder lot pollution via streams such as the St. Josephs River flowing into Lake Michigan.

LAKE COUNTY:

The problem here is twofold;

1. History: The North Shore Sanitary District has been overwhelmed with new cities, new industries and an incredible growth of population. Inadequate treatment plants have become more and more inadequate as the North Shore Sanitary District "marked Time" waiting for final decision in the famed water-diversion case. Now the case has been settled; a bond issue is proposed for renovation and renewal, rebuilding and building of new plants, with use of part of the water diversion, 60 to 150 c.p.f.s. formerly allocated only to Cook County and the Metropolitan Sanitary District, as a diluant factor with that treated effluent to be discharged into either the Skokie-Chicago River system or the Des Plaines River system.

2. Advantages: 1. No more discharge of treated sewage effluent into Lake Michigan with its cargo of phosphorus fertilizers to cause rapid growth of algae.

2. More efficient sewage treatment (up to 90%) by building secondary treatment plants at all locations. However, the nutrient pollution problem (phosphorus) has only been transferred from the Lake to the rivers.

3. Problems: The following questions are pertinent to the pollution posed by the North Shore Sanitary District:

What problems of floods and flood control will arise along the Skokie and Chicago Rivers because of the additional water placed therein -- How much will the river levels rise in ordinary flow?

What problems of floods and flood control will arise along the Des Plaines River because of the additional water placed therein -- especially in the western suburbs crowding along the Des Plaines and in the "green belt" of the forest preserves?

The Des Plaines River, according to hearings testimony, has very little pollution down to the north edge of the City of Des Plaines and has good fish life above there -- What will the sewage effluent do to the quality of the water north of Des Plaines? What will the sewage effluent do to the quality of water running through the western suburbs?

In light of the fact that the sewage effluent discharges are flowing directly and shortly into the heavily populated areas of Chicago and its western suburbs, would it not be more practical and certainly highly desirable to demand that tertiary treatment be required with 95%-98% efficiency on all levels and that further treatment be required to remove nutrient pollution before discharge into the Skokie, Chicago and Des Plaines Rivers?

What disposal is planned for storm water discharges? Any appreciable amount of additional runoff water could cause havoc in the crowded plains of Chicago, Des Plaines, Stone Park, River Grove, Maywood, River Forest and other suburbs.

Also: What happens when a lesser amount of water is available to Cook County and the Metropolitan Sanitary District of Chicago?

Recommendations: The present plans of the North Shore Sanitary District are salutory insofar as Lake County and Lake Michigan pollution problems — BUT there appears to be inadequate planning for flood control and for sufficient treatment when the factor of the heavily populated, built up areas of discharge are taken into account. Proper planning is necessary for proper water resources management and the planning herein has only been partial and not complete. All aspects must be considered before engineering is begun, and monies are expended.

COOK COUNTY, ILLINOIS

No farm problems exist here, no feed lot problems, and the industrial discharges and sewage discharges have been minimized by the reversal of the Chicago River away from Lake Michigan into the Illinois Waterway; but the extreme urbanization has brought shipping and boat pollution, dumping of polluted dredgings; bathing pollutions, combined sewer flushings as well as intermittent sewage and industrial and thermal pollutions. Nor can we minimize the sewage and industrial pollution factors: Reversal of the Chicago River flow has saved Lake Michigan but has turned the problem inward down the Illinois Waterway, to other Illinois cities, such as Peoria, who secure part of their drinking water from the Illinois River.

The pollution problems caused by sewage and industry are universal: The solutions applied to saving Lake Michigan must be reapplied to other lakes and to all rivers and streams receiving discharges. Therefore Cook County's industrial and sewage problems must be considered as part of the Lake Michigan picture.

I. INDUSTRY: Hearing in Chicago with follow-up letters have shown that industry generally is taking necessary steps on all pollution except thermal: steel is eliminating flue dust disposal, Wisconsin Steel is moving toward recirculation with minimal disposal of wastes; more and more industries are disposing of treated wastes into Sanitary District interceptors. The Metropolitan Sanitary District of Chicago has strenghtened its industrial waste division and enforcement.

II. SEWAGE:

A. The Metropolitan Sanitary District of Chicago has entered into scientific research of radiation disposal of wastes and more importantly is building a pilot plant project of tertiary treatment of sewage by filtration at its Hanover Plant.

B. There still remain many septic tanks and drain tiles which are a remnant of the horse-and-buggy age. Difficulty of supervision of the necessary repititive cleanings are the big problems here. And then the homeowner with a septic tank winds up with a second problem of finances when the septic system is replaced by a sanitary sewer and sewage treatment works at considerable personal expense to him.

C. The public utility companies for water, sewer and sewage treatment in Cook County (and Lake County as well) are generally inefficient, understaffed and overpriced and are slowly being taken over by municipal or county corporations at tremendous costs.

D. The septic systems and public utility water and sewage companies are not a direct part of the Lake Michigan problem, but their problems add to the local problems.

III. SHIPPING: The ocean-going and lake-traveling freighters and tankers dump sewage and used waters into the Lake and into the rivers and Lake at their docking points. These ships should have dockside sewer connections for all discharges when docked and recirculating systems when traveling.

IV. BOATING: The incredible increase of pleasure boats has magnified and multiplied their problems of raw sewage discharge. An ordinance of the City of Chicago is now dealing with the larger part of this problem, and harsh though the ordinance may be, it is still necessary.

V. DUMPING OF DREDGINGS: The bottoms of the Chicago and Calumet River become fouled with pollutant and polluting materials which have in the past been dredged and unceremoniously dumped into Lake Michigan without treatment; the Corps of Engineers, responding to public pressure ceased this practice in 1967 with "dry" dumping at double the expense.

VI. FLOOD CONTROL: EXCESSIVE RAINS WITH IMMEDIATE RUN-OFF HAVE CAUSED RAW SEWAGE TO BE PLACED IN LAKE MICHIGAN FROM COOK COUNTY (and from Lake County, Illinois, Lake County, Indiana, and Milwaukee, Wisconsin as well). The best method of flood control or a combination of methods, deep-tunnel, underflow or deepening of channels, combined with water installations is absolutely necessary to prevent further "sewage-into-the-Lake".

VII. LAKE AIRPORT INSTALLATION: ALL FACTS OF POLLUTION AND FOULING OF THE LAKE FROM INSTALLATION AND OPERATION OF AN ISLAND AIRPORT, and its approaches (preferably tunnelled must be fully detailed and engineered before the facility can be built.

Complete public hearings on all advantages and disadvantages must be had before finalization of a decision.

SUMMARY:

The problems on Lake Michigan:

1. Farm and agriculture pollution of herbicides, pesticides, fertilizers and feed lot animal sewage combined with siltation.

2. Industrial wastes from pulp, canning, salt, kerosene, suphuric acid, drug remnants, oil wastes, flue dust, coal dust, greases and paints.

3. Thermal pollution from utilities, oil and steel companies.

4. Raw sewage from some communities; inefficiently treated sewage from others.

5. Nutrient pollution from efficiently treated sewage.

6. Polluted dredgings dumped into the lake under the Federal government's program to keep waterways open, and from industry seeking a "cheap" way to rid itself of dredgings.

7. Raw sewage and wastes from pleasure boaters who have increased in myriad numbers in the last few years, and from commercial freighters and tankers, whose numbers have grown fantastically since the opening of the Great Lakes to ocean-going ships.

8. The fantastic problem of the alewives dying and fouling our water and beaches caused by the imbalance of fish population in turn brought about by the opening of the Welland Canal for shipping.

CONCLUSIONS:

I. CHICAGOLAND AREA:

Due to the intensive news coverage and campaigns by newspapers, especially the Chicago Tribune, and the Chicago American, all the radio stations such as WGN and WIND, all of the television stations, many of whom have run special programs, progress has been made and will probably continue apace, although most of it will be in spurts and jerks as public attention is focused and refocused from time to time on the matter.

A. Industry-- has taken long, giant steps to meet the present objections and will, in the main, probably meet all necessary standards by December 31, 1968 or shortly thereafter.

However, the present standards of performance are really short-range and not the long-range standards necessary for the full preservation of Lake Michigan and they will therefore have to be revised time and again with considerable additional costs to industry.

B. Government--The Metropolitan Sanitary District of Chicago has steadfastly maintained its position of "no-dumping" into Lake Michigan; the State of Illinois has not yet realized that no further dumping should be allowed; the City of Chicago has realized that boat pollution, which causes only a small portion of the problem, must be halted; the County of Cook has no direct approach herein, since it has no jurisdiction.

The County of Lake, Illinois is in somewhat the same position as the County of Cook because of lack of jurisdiction; the North Shore Sanitary District has begun planning but these plans are inadequate and need re-evaluation on the basis of a complete water resources management and flood control program.

Nor can the Metropolitan Sanitary District of Chicago rest easy: the threats of pollution downstream into the Illinois Waterway, and into Lake Michigan in times of flood (raw sewage has been in the past and may again in the future be released into Lake Michigan) must be corrected once and for all.

II. INDIANA:

As a result of being closely associated with, and drawn into a partnership in the Chicagoland Metropolitan Area, the problems and conclusions are much the same as the Chicagoland Area.

III. WISCONSIN AND MICHIGAN:

The problems are specific to specific areas of each state and require planning and execution -- but the planning and execution must be immediate to stop the present trends of pollution, and to reverse these trends in order to prevent the incredibly high cost of repurifying Lake Michigan.

IV. INDUSTRIAL POLLUTION:

The problems entailed herein will probably be solved first. Industry has been given a strict timetable in Southernmost Lake Michigan and is taking steps to meet their problems, particularly and especially because of the light of publicity.

V. SEWAGE:

This is the danger zone of the future. The bigger problems of raw sewage, inefficiently treated sewage and nutrient pollution by efficiently treated sewage will remain and will increase as the greater, the larger problem growing day by day. The algae problems from these sources will undoubtedly get worse before they get better.

There is no reason to place a completion date of December 31, 1968 on industrial compliance on industrial wastes and to set a date of December 31, 1972 for governmental agencies such as the North Shore Sanitary District to stop dumping sewage into our drinking waters of Lake Michigan. These timetables should be comparable.

RECOMMENDATIONS:

This problem -- cancer by pollution of our waters, especially Lake Michigan must be met by long range water management and resources policies, all of them to meet the challenge of the handwriting on the wall:

"MENE, MENE, TEKEL, UPHARSIN"

(A fateful, a direful event is about to occur)

I. INDUSTRY--will finally be faced with the proper solution:

COMPLETE RECIRCULATION OF WATER WITH USE OF COOLING TOWERS AND NO DISCHARGE OF ANY INDUSTRIAL WASTES INTO ANY LAKES, RIVERS OR STREAMS.

II. SANITARY DISTRICTS AND MUNICIPALITIES--whether they discharge directly into Lake Michigan, into tributary streams, or into streams flowing away from the Lake must install and operate at 98% or 99% efficiency and must remove nutrient pollution. At the present status of recognized treatment --

THIS MEANS TERTIARY TREATMENT BY FILTRATION
WITH REMOVAL OF NUTRIENT POLLUTANTS.

III. STATES, MUNICIPALITIES AND SANITARY DISTRICTS--must solve the problems of the combined sewers--by flood control of reservoirs, deep tunnels, underflow tunnels, deepening of channels, or a combination of them, further combined with the best sewage treatment and water management and water resources practices to prevent pollution, to secure proper dilution, and to provide "reusable" water for industry, and for other municipalities.

IV. FEED LOT OPERATORS--cannot and must not be allowed to flush animal wastes into our drinking waters, directly or indirectly.

V. PLEASURE BOATERS AND SPORTSMEN--should in their own best interests comply with all statutes and go beyond same voluntarily to prevent all pollution on their part...

"PEOPLE WHO LIVE IN GLASS HOUSES...."

VI. COMMERCIAL SHIPPING--should immediately cease discharge of all pollutant materials while traveling; and when docked should be furnished a connection at dockside to the nearest sewage facility.

VII. THE UNITED STATES DEPARTMENT OF AGRICULTURE--which has preempted the farm problems, including siltation, herbicides, pesticides, and fertilizers, must needs devote more time, more money and more men to these problems immediately.

VIII. THE FOUR SOVEREIGN STATES--bordering on Lake Michigan must adopt the necessary legislative acts and regulations consistent with the proven goal --

THE CONTINUED SAFETY AND PURITY
OF THE WATERS OF LAKE MICHIGAN

as their prime goal. This includes complete removal of the right to issue dumping permits.

IX. THE FEDERAL GOVERNMENT--must bend all its efforts to the same goal --

THE CONTINUED SAFETY AND PURITY
OF THE WATERS OF LAKE MICHIGAN

instead of divisive efforts between and among the various agencies. The Corps of Engineers must be provided with sufficient funds to end all Lake dumpings, whether it be Lake Michigan, Lake Superior, Lake Huron, Lake Erie or Lake Ontario. Keeping the waterways open for commercial traffic is important, but keeping drinking water safe is still more important.

X. THE FEDERAL GOVERNMENT--must provide distinctive leadership and the major share of funds and tax incentive devices to lead the way:

Not as the overseer with the whip, not as the indulgent father with goodies for obeying children, not with pronunciamentos and press releases with no results, but with down-to-earth conferences to seek out problems, to devise the best solution in line with the best water management resources policies and with tax-incentive policies to aid all industries, and with the providing of sufficient funds through small interest loans and grants so that the problems can be met by the states, counties, municipalities and sanitary districts and the solutions applied properly.

XI. THE CITIZENRY OF THE AREA--must be kept aware of the problems as they arise -- and old and new problems will undoubtedly continue to arise; having been advised of the problems and potential solutions, it is the belief of this Commission that an aroused citizenry will make and will enforce its demands for the necessary solutions.

THE MOVING FINGER WILL WRITE--

BUT WE HAVE THE POWER TO CHANGE THE STORY IT IS WRITING....

MENE, MENE, TEKEL--

BUT WE HAVE THE KNOW-HOW TO PREVENT THE OCCURENCE OF THE DIREFUL EVENT....

ALGAE, ALGAE, EVERYWHERE---

BUT WE CAN PROVIDE SAFE, CLEAN BEACHES FOR SWIMMING.....

ALL CONCERNED MUST PLAN, ENGINEER AND EXECUTE

TO

SAVE OUR LAKE....

CARL L. KLEIN

MR. KLEIN: I have been appalled during our investigations and during conversations and more recently by statements in the press and other news media of the following attitudes:

"We are only causing minor pollution."

"I'm not polluting as much as the other fellow."

"I am working on the problem but my neighbor isn't."

"I'll do something about it tomorrow or the next day, but I have to continue polluting now."

"My sister State isn't doing anything. Why should I?"

"Let the Federal Government do it," followed by, "Get them out of here, but have them leave their money."

Gentlemen, it is time to stop this senseless bickering. Stop looking for the mote in thy brother's eye and look into thine own eye for thine own mote.

All of us know the problems are here, no great effort is needed to enumerate the most important.

1. By far, the most important is: Nutrient pollutants from sewage and industrial waste. We have planted the seeds of algae pollution, which will continue to haunt us for generations to come.

2. Dumping of raw or inadequately treated human sewage.

3. Industrial wastes from pulp, canning, steel, oil and a thousand other industries.

4. Siltation, herbicides, pesticides and fertilizers from agriculture.

5. Pollution from cattle and hog feed lots.

6. Dumping of polluted dredgings.

7. Thermal pollution from coolant use of water.

8. Boat pollution both from commercial freighters and sporting boats.

An all-out attack is indicated as being necessary. Complete solutions must be begun. Patchwork solutions which only complicate the simple issue of saving the lake must be put aside to arrive at these final and these definitive conclusions:

1. INDUSTRY--Must install complete recirculation of water, including use of cooling towers wherever necessary. No discharge of industrial waste and no thermal pollution is the final answer.

2. SANITARY DISTRICTS--Tertiary treatment by filtration with removal of nutrient pollutants is required. All concerned recognize that there must be a discharge of treated sewage effluents and, therefore, 98 percent to 99 percent removal is necessary, as well as removal of nutrient pollutants. FAILURE TO DO SO WILL ONLY MULTIPLY THE ALGAE PROBLEMS.

3. The dates for completion of all anti-pollution measures must be comparable whether industrial or municipal. We cannot set a short date for industry and boaters and then say to a sanitary district, "You can keep on throwing partially treated or raw sewage into Lake Michigan for another four years."

4. There can be no dumping of polluted dredgings at any time by anybody, Federal, State or private, into any of our Great Lakes. We must stop issuance of all State permits for this purpose, and our Congressmen, Senators and Federal Government must vote sufficient funds to the Corps of Engineers to have complete "dry dumping" without any pollution after effects.

5. My other recommendations are set forth in the report of the Commission.

And if you say to me these are too tough, you are unrealistic, I say to you, "You are not doing long range planning of water resources management."

"You have not taken into account the future inevitable, fantastic growths of population and industries on this marvelous supply of life-giving water."

And, "You are being selfish and you are being untrue to your posterity, who need your protection."

And the above solutions are being already recognized as being necessary.

CARL L. KLEIN

Industry has already seen the handwriting on the wall and is now proceeding to complete recirculation in their plants, such as Arnold Engineering in Morengo and Wisconsin Steel on the Calumet River.

Our own Metropolitan Sanitary District of Chicago is installing tertiary treatment by filtration at Hanover.

The City of Chicago is requiring recirculation on pleasure boats.

The Corps of Engineers is bending every effort in the Chicagoland area to prevent further dumping of dredgings into Lake Michigan.

And why are these tough remedies necessary? We have had a succession of speakers saying: "The lake is sick, it is dying, it is going the way of Lake Erie," but the things they have not said plainly are:

1. Pollution is cancer of the water. Like cancer, heroic remedies are needed to stop it and to cure it.

2. The spread of pollution, and especially algae pollution, is not an arithmetical progression, but more probably

a geometric progression. Today it is spreading at a fantastic rate all over the lake. Even the billions of gallons of pure water in the center of the lake have shown signs of pollution and need protection from this curse.

3. Words are not sufficient; only positive, thorough and complete action will do the job. This is now a matter for the engineers to plan, engineer and construct on the guidelines and deadlines set by the four States in conjunction with the Federal Government.

Gentlemen, let us leave off the pronunciamentos and press releases. They cure nothing and only confound the issues.

Let us have Federal leadership and emergency appropriations for this emergency on Lake Michigan to set an example to our solution on water problems in other areas as well of our States and of our United States.

Let us bend our actions to four-State cooperation of doings to complete the legislation and the further appropriations necessary to do the job.

These are the recommendations. And

now I will go off on another track.

It is obvious that one of the prime requirements is uniform anti-pollution standards and laws and uniform water resources management laws in these four States to accomplish our goals:

To that end, being concerned on the future conservation of Lake Michigan, legislators from the four States of Illinois, Indiana, Michigan and Wisconsin have been in contact with each other since the early part of 1967 with no fanfare, but with honest correspondence, conversations and conferences, with sometimes two, sometimes three and sometimes all four of the legislators participating.

We have recognized the problems, we are working on the solutions. We expect to present to the General Assemblies of the four States in 1969 a series of uniform bills designed to meet the problems and solve them properly.

This action on our part is in conformity with the thoughts, words and deeds of this Four State Conference.

May I introduce the other three legislators who have been working with me on this project?

Senator William Christy of Hammond, Indiana, Chairman of the Conservation Committee. Senator Christy.

(Applause.)

Representative James C. Devitt of Milwaukee, Wisconsin, Member of the Committee on Conservation.

(Applause.)

We have a fourth member who got called to the phone just at this time, Representative Raymond L. Baker of Farmington, Michigan, Chairman of the Joint Legislative Committee on Water Resources Planning.

(Applause.)

Gentlemen, four-State cooperation is a fact. We have put it into being and we will follow it through to the necessary ends.

Thank you.

(Applause.)

MR. STEIN: Thank you, Representative

Klein.

Are there any comments or questions?

MR. HOLMER: Mr. Chairman, I have a question, and I hesitate to do this with--

MR. STEIN: No, you go right ahead.

MR. HOLMER: --lunch just a short way off.

But I find accompanying your remarks, Representative Klein, is a document entitled "Report on Lake Michigan Pollution" by the Water Pollution and Water Resources Commission of Illinois of which you are Chairman, and inside it makes a swing around the lake, so called, in which it makes some remarks about the state of water pollution in Michigan and Wisconsin and Indiana as well as a very extensive treatment of the Illinois part of the lake.

There are several statements made in the paragraphs that relate to Wisconsin which lead to what would seem to me to be a rather unfortunate impression. One, for example, at the end of the first paragraph is that the picture of Green Bay is gloomier every day. I would certainly not want to pretend that the picture of Green Bay is not one that does not require our best and most vigorous efforts, but these efforts are in process. We have just completed within the last two weeks a major hearing on the results of our pollutional investigation of the lower Fox River that empties into Green Bay and are in the process of developing necessary orders to achieve further cleanup.

But we do not in Wisconsin view our picture as gloomier every day. Rather we take some pride in the fact that we have a strong and vigorous law and one that looks to the improvement of Fox and of Green Bay. And so we would not certainly want that statement to pass unchallenged.

I could say more about the other paragraphs in the report, but I think that is perhaps enough at this time.

MR. KLEIN: If I may, I would say to you that so far as I am concerned the picture gets gloomier every day on all four States as far as Lake Michigan is concerned.

I cannot see but where the lake will be worse this year than it was last year and where it will be worse the year after that, but I hope that by the end of 1970 we will halt the trend and start the other way. I just don't think we have the tools that are able to stop it immediately, and, therefore, I do think it is gloomier and it is not just that one portion thereof.

I think you will find that I have carried that all the way through there. I just think we all got started too late because we just didn't know the problem was there until recently. We are all getting started and I don't see how we can stop this trend this year or next year. Maybe by the end of 1970 we will have stopped the trend and be able to reverse it.

MR. STEIN: Do we have any further comments or questions?

If not, we will stand recessed for lunch and reconvene at 2 o'clock.

(Whereupon, at 12:30 p.m., a recess was taken until 2:00 p.m., of the same day.)

AFTERNOON SESSION

(2:00 p.m.)

MR. STEIN: The conference will reconvene.

Mr. Klassen.

ILLINOIS PRESENTATION (CONTINUED)

MR. KLASSEN: Mr. Chairman, just a quick rundown on what Illinois plans are for this afternoon.

Again because the technical presentations of the Chicago Water Department will take about 45 minutes, we are deferring this until the first thing Monday morning.

Also President John Egan of the Metropolitan Sanitary District of Chicago is in the hospital, expected to be released this morning in time to make a presentation. His doctors advised him not to. Their presentation will also be made by President Egan on Monday.

The time alloted, I understand, about an hour plus or minus, for Illinois this afternoon will be taken up with a number of short presentations that had been originally scheduled nearer the end of Illinois time. But in adjusting the time schedule to this afternoon and some of the other presentations that I understand the Federal agencies want to make, the Illinois time will be taken up with a number of short statements by interested people, organizations, and political entities like the North Shore Sanitary District, for example.

We have made some commitments here. The first person I want to call on this afternoon is Representative Harold Katz, who will make a statement, I believe, on his own behalf and then merely read into the record a statement from another organization.

Representative Katz.

ILLINOIS STATE REPRESENTATIVE
GLENCOE, ILLINOIS

MR. KATZ: Mr. Chairman and ladies and gentlemen, since I have a prepared statement, I will not take the time of everyone here to read that statement. I will simply put it in the record.

MR. STEIN: Without objection, the statement will appear in the record as if read.

(Which said statement is as follows:)

STATEMENT OF ILLINOIS STATE REPRESENTATIVE
HAROLD A. KATZ (D. Glencoe) AT FEDERAL
POLLUTION HEARING, CHICAGO, ILLINOIS

(SUMMARY OF REMARKS)

State responsibilities must go along hand-in-hand with "state's rights." Federal Government has wisely entered field since States have been derelict in meeting their responsibilities in the water pollution field. In addition, nature of the problem requires a paramount authority that only Federal Government can exercise.

Lake Michigan States discharge daily into the lake the pollution equivalent of the raw sewage from a population of almost ten million citizens, as follows:

State	Percentage	Population Equivalent Discharge to Lake
Indiana	55.5%	5,370,000
Wisconsin	38.2%	3,709,400
Michigan	6.0%	599,500
Illinois	0.3%	27,000
TOTAL	100.0%	9,705,900

(See Table at end for fuller breakdown)

Industrial polluters that discharge substances that settle in streams and require dredging to keep the streams navigable should be forced to bear the cost of such work, just as citizen who damages public property (such as police car or fire plug) is made to pay for the cost of restoring the object to its original condition.

* * *

The problem of our time is that our rising social consciousness has brought to the fore so many genuinely substantial problems affecting human well-being that we are in danger of not being able to respond adequately when a genuine crisis of monumental and historic proportion is presented. As we procrastinate, the patient is being killed by the toxic materials that daily are introduced into the circulatory system. The Calumet River and Burns Ditch pour cancerous cells into the Midwest's vital artery; the once lovely Fox River has become the aquatic equivalent of Typhoid Mary. We are well along the way toward destruction of our most precious natural resource, and I would like to suggest briefly here what seems to me to be the major things which we shall have to do to prevent such a result.

1. Waste disposal system: We shall have to decide whether we will any longer tolerate the use of Lake Michigan and other tributary streams as a repository for human and industrial wastes. It is an extraordinary thing that men who would never countenance the dumping of garbage and industrial wastes in the streets would both permit and indeed participate in the dumping of such material into our waterways and into the lake. We shall have to firmly resolve that this waterway system will not be permitted to be used any further for the purpose of waste disposal, and this shall have to be made the very top priority so that no exceptions will be

permitted.

I have been hearing a great deal recently about "State's rights," with hostility expressed by some State water officials toward the Federal Government for having "moved in." Well, let us have an equivalent attention to the question of State responsibilities. The story is told of the man laboring in the hot sun one summer day in his beautiful garden. A congenial minister happened to be strolling down the street. Impressed by the beauty of the flowers and the grass, the pastor remarked to the man, "You and the Lord have done a magnificent job working this lawn together." To which the man responded: "You should have seen it when the Lord took care of it alone." What, Mr. Secretary, did the Lake Michigan States do when each was taking care of its part of the lake alone?

The Lake Michigan States discharge daily into the lake the pollution equivalent of the raw sewage discharge from a population of almost ten million citizens. Any wonder that Lake Michigan is staggering under the impact of that load? Here in a nutshell is where the pollutants that peril the lake originate:

State	Percentage	Population Equivalent Discharge to Lake
Indiana	55.5%	5,370,000
Wisconsin	38.2%	3,709,400
Michigan	6.0%	599,500
Illinois	0.3%	27,000
TOTAL	100.0%	9,705,900

(See Table at end for fuller breakdown)

Now, Mr. Secretary, I want to make perfectly clear that while I am pleased that my own State, Illinois, ranks so low in this Table, I do not justify even the three-tenths of one percent that we contribute toward this problem. The day has now passed when any further pollution of Lake Michigan can be tolerated, or where recrimination is an acceptable substitute in the solution of the problem of contamination. On the other hand, I do not accept the notion that State boundaries insulate responsible officials of one State from accountability to citizens of another lake State, any more than to their own. It is our lake they are polluting, as well as their own. This is why it was inevitable that the Federal Government act, and Governor Kerner is to be commended for having made the request that initiated this conference.

2. Enforcement: A successful enforcement program must do two things: first, it must lodge authority in a responsible and accountable source; and second, that source must promulgate not pious pronouncements but a specific series of dates by which in a relatively short period of time, step by step, the lake will have been protected from all sources of pollution.

The source of responsibility must clearly be the Federal Government. So long as responsibility can be shifted, buck-passing will continue to be the order of the day. If the public and the press know wherein the responsibility is vested, woe unto the public official who fails to discharge this mandate.

All of us who are State officials are, I am sure, most zealous in our desire to see that the power of the States be maintained. This problem, however, is one that inherently requires some top authority. Through our

Constitution, this must necessarily be the Federal Government. Lodging the authority in the Federal Government, as Congress has done, will in fact make it possible for each State better to discharge its own responsibilities in this regard.

Cleaning up pollution is obviously not only a difficult, but expensive, endeavor. Yet the nature of the problem is such that the expenditure in a particular State will be in vain if one of the other States fails to discharge its responsibilities. All of us will be able to exact the greatest effort and contribution from the citizens in our own State if we are assured and they are assured that the expenditure will not be a needless and useless expenditure, which would be the case if another State were permitted to drag its feet while the inexorable pollution process continues.

Finally, the polluters themselves have made it essential that the Federal Government act vigorously. In recent litigation undertaken by the Metropolitan Sanitary District of Greater Chicago against certain offending firms, some of the defendants argued that the enactment of the Federal Water Pollution Act had preempted the State from any authority to act in this field. Having undertaken to act, the Federal Government must act decisively. Otherwise, it may have created a no-man's land in which its activities would insulate harmful activities from public control. In fairness also to those who must now take corrective action, it is vital that there be uniform standards. Otherwise, action taken at the behest of one State may be held to be insufficient by another. Only the Federal Government can prevent such a result.

3. Dilution: It would be a healthy thing for the lake if substantial dilution water could be obtained from Canada. Immediate steps should be undertaken by the Federal Government, acting in concert with Lake Michigan States, to work out an agreement with Canada to bring about this result. But the urgency of the crisis demands an urgent response.

4. Sewer separation: With full knowledge of the immensity of the task, it is still a fact that sewer separation is essential for the

protection of the lake. Standards shall have to be imposed which must be complied with as a condition of continued use of the lake and of the tributaries for sanitation purposes. Fortunately, our basic knowledge and technology have expanded to the point where we can now continue to make use of the lake for human and industrial purposes without adversely affecting the quality of the water. The processes are there for us to use, but compulsion shall have to be applied to see that they are utilized.

5. Cost of pollution: We hear a lot about the cost industry will incur if it has to purchase the equipment necessary to purify its waters, but not enough about the cost that is necessitated by its not doing so. A general example is the increasing cost of municipal purification of marginal water. A specific example is in the field of dredging. Industry discharges substances that collect on the bottom of the tributaries of the lake. It then becomes necessary for the stream to be dredged to enable it to be used for navigational purposes. As it has operated, the public has had to bear the cost

of this dredging work. But why should not an industry that is polluting the stream be required to bear the full cost of its deleterious activities? If I get in an automobile accident and damage public property, the cost for correcting the damage is placed upon me. Why should a company be treated any differently? With lake dumping no longer tolerable, the cost of dredging will substantially increase. Why should not the cost be imposed on the responsible party?

There has been talk recently of "creative federalism" in which the Federal Government and the States work together within the Constitutional framework to advance mutual vital objectives. I would suggest that no field exists in which the partnership can be more productive and useful, and the results more meaningful, than in the preservation of the Nation's natural resources.

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Table

PRINCIPAL BOD DISCHARGES TO LAKE MICHIGAN AND TRIBUTARIES

State	5-Day BOD Pounds Per Day Discharged			Percent of Total Pollution		Population Equivalent Discharged
	Communities	Industrials	Totals			Totals
INDIANA						
Calumet River and Burns Ditch	13, 530	885, 150	898, 680	55.5%		5, 370, 000
WISCONSIN						
Milwaukee Group	59, 000	26, 260	85, 260			512, 000
Sheboygan	16, 200	(no data)	16, 200			97, 200
Fox River	43, 060	314, 600	357, 660			2, 246, 000
No. Wisc. Group	5, 840	136, 500	142, 340			854, 200
				38.2%		3, 709, 400
MICHIGAN						
N. W. Group	1, 850	11, 200	13, 050			78, 300
N. E. Group	15, 400	(no data)	15, 400			92, 400
Grand River	16, 190	(no data)	16, 190			97, 100
Kalamasoo River	30, 850	(no data)	30, 850			185, 100
St. Joseph River	25, 430	(no data)	25, 430			146, 600
				6.0%		599, 500
ILLINOIS						
Lake Co. Group	4, 490	(minor)	4, 490	0.3%		27, 000
TOTALS	231, 840	1, 373, 710	1, 605, 550	100.0%	TOTAL	9, 705, 900

Data from Federal Water Pollution Control Administration, U.S. Department of Interior, and from Great Lakes Research Division, Institute of Science and Technology, University of Michigan, publications.

MR. KATZ: Now, I would like, however, to make a few very brief remarks that are touched on and it will take no more than a very few moments.

I believe that in our present situation we have been prone to talk a good deal about State's rights, and I would like to urge that we direct attention to another facet of that problem, which is State responsibilities. And I suggest that we take a look at where the pollution is coming from and that there is a responsibility incumbent upon those States to do something about it.

And I have suggested in a table here, which is being put into the record, that the study of the principal BOD discharges to Lake Michigan and tributaries would indicate that there is being discharged into Lake Michigan at the present time the equivalent in terms of its BOD pounds per day discharge of what would be discharged from a population of 9,705,900, raw sewage in that amount, the equivalent of that is being discharged into our lake; that of this more than the equivalent of 5,000,000 people comes from the State of Indiana, 55.5 percent of the total BOD pollution comes from Indiana, 38.2 percent from Wisconsin, 6 percent, or perhaps greater, because the data is somewhat lacking, comes from Michigan, and from Illinois 3/10 of 1 percent.

Now, I don't want to be up here to express any sense that Illinois is perfect. I think that we should try to get rid of that three-tenths of one percent that we do have.

But I do not either accept the notion that State boundaries insulate responsible officials of one State from accountability to citizens of another lake State any more than an official of Indiana is responsible, for example, to the people in Indiana, because it is our lake they are polluting as well as their own lake, and that is the reason why the Federal Government, in my opinion, had to come in and had to act in this situation.

I do believe that enforcement, immediate enforcement, and very active steps by the Federal Government is quite essential. It was impossible ever early to believe that the four States in concert could solve the problem alone. Very practically, I, as a legislator in Illinois who is going to have to vote on some very large amounts of money that is going to be required, will be assisted in my task if I know that the other States are going to have to be doing the same thing; because it would be totally or almost a totally useless expenditure for one State to make if, in fact, the other States did not live up to their obligation, because, of course, any one of the States can succeed in polluting the entire lake.

For that reason, it seems to me that the entrance of the Federal Government in the field really makes the States much better able to discharge the responsibility that each State has.

I do think that more could be done and must be done by way of dilution water from Canada. I think there are real reasons why it could be beneficial to Canada and certainly to us. I think sewer separation is going to have to come, even though it is a costly process, but it is absolutely essential.

Now, we hear a lot about the cost industry will incur if it has to purchase the equipment necessary to purify its waters, but not enough about the cost that is necessitated by its not doing so. A general example is the increasing cost of municipal purification of marginal water. A more specific example is in the field of dredging. Industry discharges substances that collect on the bottom of the tributaries of the lake. It then becomes necessary for the stream to be dredged to enable it to be used for navigational purposes. As it has operated in the past, the public has had to bear the cost of this dredging work, but should not an industry that is polluting the stream be required to bear the full cost of its deleterious activities? If I get in an automobile accident and damage public property, for example if I damage a police car in an accident or I damage a fire plug, the cost for correcting the damage is placed upon me, I must pay for it. Why should not the cost of cleaning up and dredging streams, if the condition resulted from the discharges of an industry into that stream, be assessed upon that company? There is no reason why that should be a public cost, as it now is.

And I indicate here that with lake dumping no longer tolerable the cost of dredging will substantially increase. I gathered this morning that the Army Corps of Engineers may still entertain some doubts about this question of lake dumping, and that seems to me an extraordinary situation, that with the patient in its throes and with the possibility of death facing the lake that the Army Corps of Engineers would be still sitting and debating about dumping into the lake. It seems to me that we have passed the point where we can put anything into the lake which poses any problems. And I would suggest that the Federal Government through its arms, namely the Army Corps of Engineers, should get in step with what seems to me the essential movement of the people of this area, their representatives, and I believe the general consensus, and that is that dumping into Lake Michigan in any form is no longer tolerable and that we must do something about this problem immediately.

Now, Mr. Chairman, there was another statement that was to be presented this morning by Mr. Robert Johnston, the Regional Director of the United Auto Workers. Mr. Johnston did remain around all morning, but he had to go to negotiations involving International Harvester Company, since there may be a strike there, and I have his statement and ask that it be incorporated in the record as if he had presented it this morning.

MR. STEIN: Yes, that statement will be presented as if read, without objection.

Do you have copies of that statement?

MR. KATZ: Yes. I don't have enough to go around. I have one for your reporter and it can be in the record.

MR. STEIN: All right.

Mr. Cook, do you want to see if you can get that reproduced?

MR. COOK: Yes, I will.

(Which said statement is as follows:)

STATEMENT BY ROBERT JOHNSTON, DIRECTOR,
UAW, REGION 4, (Chicago, Illinois) ON
BEHALF OF THE UNITED AUTO, AEROSPACE,
AGRICULTURAL IMPLEMENT WORKERS UNION,
TO THE FOUR STATE CONFERENCE ON LAKE
MICHIGAN, SHERMAN HOTEL, FEBRUARY 1, 1968.

The UAW wishes to associate itself at this conference with those who believe that we are in danger of being too late with too little if we are to save Lake Michigan. Fifty years of indifference and inaction about Lake Michigan and the Great Lakes has created a problem that can't be solved by old techniques that are comparable to trying to bail out pollution with a bucket. Reliance on such techniques will only result in creating another Dead Sea along the industrial and urban waterfronts of Lake Michigan.

The formula for saving Lake Michigan and the Great Lakes is simple enough. All that is needed is higher anti-pollution standards and the realization of these standards by faster action and rigid enforcement. We believe that the present Federal and State laws are inadequate to secure the enforcement of the anti-pollution measures that are needed. We believe that the present Federal funds, reduced in the proposed new budget, are inadequate to assist cities and States in pure water projects. We also believe, despite the good intentions of President Lyndon Johnson and Secretary Udall, that there are too many members of this Congress who aren't any more interested in saving lakes than they are cities.

If these are the current political facts of life, then one of the most important things that can be done immediately is to arouse public opinion to demand that those most responsible for polluting Lake Michigan, the corporations and the shipping companies, move immediately to stop polluting the lake.

The corporations responsible for turning the lakefront into an industrial cesspool reads like a Blue Book of big profit companies in America. United States Steel, Ford Motor Company, Standard Oil, International Harvester, Inland Steel, Republic Steel, Sinclair Refining Company. The Who's Who of Big Business have helped themselves to billions in profits by using the lake water and dumping back pollutants. These same corporations are protesting adequate anti-pollution standards, and dragging their feet under the inadequate enforcement provisions. An excellent example of this public-be-damned attitude is the refusal of steel companies to permit Indiana Harbor muck to be dumped on their land, and the high price being asked by Standard Oil to permit dumping on its undeveloped property near Wolf Lake.

The labor movement deserves to be criticized for leaving the corporation polluters alone too long. It isn't enough for a union to get sufficient drinking fountains and hot showers in an auto plant or a steel mill and ignore the fact that the companies are helping kill a great natural resource like Lake Michigan. The lake belongs to union dues payers and the rest of the public, and not to corporations. The labor movement therefore has an obligation to also fight to save the lake.

The UAW is proud of the fact that it is the only union that has held a national conference to arouse our membership to the necessity to participate in all City, State and Federal activities on water and air pollution. We urge the rest of the labor movement to take similar action. The results of this four-State conference will be discussed at the UAW's regional council next month in Chicago, and our local union leaders will be asked to help implement its result. We have assigned International Representatives to work specifically on the problem of Lake Michigan because we consider it to be one of the biggest grievances we have against the corporations. And we intend to win it.

The corporations certainly can plead poverty about our grievance over Lake Michigan. Corporations in the industrial complex along the lake make several billion in profits annually. They have invested hundreds of millions in the most modern automated equipment and new plants while delaying the installation of effective anti-pollutant systems.

ROBERT JOHNSTON

The UAW has welcomed recently the signs of an awakening social conscience on the part of some corporations on such national problems as hard-core unemployment, open housing, and low-cost housing developments. The corporations should also expand their moral obligation to cleaning up Lake Michigan. All these problems have a relationship. Behind the big profit plants on the polluted lake are the poor neighborhoods and the slums enveloped in polluted air and all the increasing social problems of the urban centers. We are either going to clean up Lake Michigan and the slums behind them or the indifference of corporate neglect and public apathy will fan some social firestorms that all the polluted water in the Great Lakes can't put out.

The final solution to pure water, the new sewerage and sanitation systems needed by the cities and the cleaning up of the rivers that dump into Lake Michigan and the Great Lakes, depends upon putting a proper high national and State priority on this crucial problem and allocating adequate funds to solve the problem.

We in the UAW believe that our Nation must remain strong, not only in military hardware, but in social progress. As President Walter Reuther pointed out at our National Pure Water Conference, "We must find a way to spend as much on such basic necessities of life as water and fresh air and social welfare as we do on defense and armaments."

The saving of Lake Michigan could be greatly aided immediately by the practical step of Congressional or Executive action to require corporations who are profiting from Government orders to take effective action to stop polluting any national lake or waterway. There isn't any good reason why corporations should be paid taxpayers money for Government work if they continue to pollute Lake Michigan or any other waterway.

The UAW also believes that all candidates for City, State and Federal office should have their position on corrective water and air pollution actions taken into account before they receive any endorsement by labor unions in forthcoming elections. In Illinois this evaluation must include a candidate's position on the proposed one billion dollar bond issue for pure water that will be submitted to the voters in the November election. The passage of this bond issue is a necessary first step at the State level because of the long years of unrestricted pollution of Illinois waterways.

MR. STEIN: Mr. Klassen.

MR. KLASSEN: Next is Mr. Abner Mikva, a citizen on the lake.

STATEMENT BY ABNER J. MIKVA
CITIZEN, CITY OF CHICAGO

MR, MIKVA: Mr. Chairman, members.

I appreciate the opportunity to appear here as a private citizen who sees and uses both sides of the lake. And as a former State Representative, I have had to wrestle with some of the budgetary problems that Representative Katz referred to.

I live on Chicago's South Side, approximately one-half mile from the lake. I own a house in the Michigan Dunes in an unincorporated area just outside of New Buffalo, Michigan. As a consistent user of both sides of the lake, I can tell you that in addition to the dire predictions that you have been hearing for the last couple of days about the things that are going to happen to the lake, I want to tell you that as of last summer Lake Michigan was and continues to be a disaster area. The changes that have occurred in the last ten years have incredibly diminished--incredibly diminished--both its usability for recreational purposes and its esthetic values.

I am aware that you have heard, and will continue to hear, many days of expert testimony about the causes of lake pollution and their cures. I don't pretend to be an expert, but I am dismayed when I hear the solutions being talked about in 1970 and 1971 and 1972, because I say that unless some of these esthetic and recreational values of the lake are preserved, you will lose the much needed support of the public for the kind of expenditures that you are talking about to solve the long-range problems of lake pollution.

For example, I was very dismayed to

find the Department of Interior report, a very commendable job technically, which was presented to this conference, devoted the total of one-half page--one-half page--to the alewife problem, and not a single word in there recommends about what to do about it. Gentlemen, last year, for over half of the summer recreational season Lake Michigan was virtually unusable--unusable--because of the alewives. It was not only sickening to the smell and touch, it brought on practical health problems as well. For example, kids could not use the beach because their feet would end up a bloody mess from the jagged edges of dried alewives. The maggots and flies that followed the alewife inundation made it impossible to use the beach for weeks after the alewives finally stopped coming in. I don't know how much it cost the cities and villages along the lake to clear the alewives on almost a daily basis; I do know that in many unincorporated areas such as mine it meant constant raking and digging, to absolutely no avail. For the entire months of June and

July, gentlemen, the lake was unusable for swimming purposes, for walking purposes, or for being anywhere within a couple of blocks of it if you had a nose on your face.

I am aware that there is some hopeful long-range plan for restoring the fish life balance of Lake Michigan, and they are great plans. I hope they are pursued. But you know and I know that restocking the lake with salmon isn't going to do one thing about the alewife problem next year. The question I think that citizens have the right to ask you now is what will you do for next summer and the summer after. There must be, and, gentlemen, you know there are, some short-range steps, not cures, but short-range steps that can be taken to alleviate the alewife problem. The bands of alewives, for example, stretch for miles out in the lake before they hit the shore. Is it too much to ask the Federal and/or State Governments to co-operate in cutting off the dead alewife supply before they hit the beach? Surely there is a way of seining them out. It has been done elsewhere. I am aware there is some money involved, but in comparison with the millions we are talking about about the long-range solution, isn't it worth a few hundred thousand dollars to seine the lake of these alewives, at least along the recreational portions that are being used?

I realize that the causes of algae are complex. The growth of it on the eastern shore, for example, in the last eight years has been incredible. When I first started going up to Michigan that lake water was absolutely pure and pristine, at least to the eye, and now you can't tell it from the very southern tip of the lake. But I think that in terms of short-run effects, it is unreasonable to ask our governments, Federal and State, to do something about cleaning and protecting the beaches and other recreational areas from some of the algae until the long-run solutions are achieved. Would it not be a worthwhile project for Federal and State conservation crews to net some of the beaches to at least hold out some of the algae?

Gentlemen, there are approximately 80

miles of beaches on Lake Michigan, a shoreline consisting of thousands of miles. Surely it is worth that to keep the public on our side in using the lake.

In the same vein, I again think something can be done now about what is a comparatively small problem. I refer to the outboard motor boats. I should hasten to add that I own one and certainly am not hostile to boats *per se*. My objection goes to their litter. I have seen Coast Guard cutters and sheriffs' patrol boats blithely pass some of the outboard motors, wave to them while the outboard motors are dumping their beer cans and wastes right into the lake, without any action being taken whatsoever. I think the rules against littering the lake ought to be strict and they ought to be strictly enforced and, indeed, in this instance I think they ought to be Federal rules. I do not think it would be unreasonable to take away a boat owner's privilege to use a lake if he insists on fouling it while he is using it. I think that the ordinance Chicago passed requiring boats to have suitable waste facilities should be emulated as a matter of Federal rule.

While I am on the matter of boats, I think it is not too soon to start doing something about the oil spewing problems of outboard motors. I understand there are new engines on the market which do not use the oil and gas mixture common to present boat motors. Again, I do not know how serious a pollution problem this causes. I do know what an unsightly mess follows in the wake of any motor boat with the standard type motor. It seems to me it would not be too soon for the Federal and/or State governments to insist that all boat motors manufactured in the future should be of a design which would cut down the amount of oil and gas spilling into the lake that goes out in the present use of outboard motors.

Gentlemen, I hope these deliberations will save our lake for the future generations. However, I earnestly believe that unless some immediate steps and visible steps are taken that the public can see and feel and smell, just as they can see and feel and smell the alewives and the algae, unless they are taken for this summer, I think that the people will abandon the lake, and once they do that, the task of developing popular support for the long-run solutions, the task of developing popular support for million dollar bond issues, is going to be an almost impossible one.

Gentlemen, this is February and summer is just around the corner. As a citizen, I think I speak for a lot of lake users who ask, what are you going to do for us right now?

Thank you very much.

(Applause.)

MR. STEIN: Thank you, Representative Mikva.

You know, the ways of any large organization such as the Federal bureaucracy are passing strange. Maybe the people who work close with it have a little different view, and I can understand the situation.

The question of the Federal report on the alewives, if you read this report that was put in and read the small print, this is a report from the Federal Water Pollution Control

Administration. The alewife situation here was deliberately handled very lightly with a paragraph or two, as I understand it, to flag it because the Fish and Wildlife group made the extensive statement on the alewives, and to avoid duplication, the work was divided up in that way.

Of course the alewife problem is a vital one, the question of what to do about alewives in the short run, if anything. We can propose a program. It is certainly open for discussion by the conferees. Several of the other participants--Mr. Clevenger, for example--have also spotlighted the problem of dealing with the alewives next summer.

Now, we have also had several requests, and I understand in a big conference like this sometimes you can't tell the players without a scorecard. People have asked for a list of the conferees and their titles. Sometime this afternoon you can pick that up in the back, together with a fact sheet on the conference,which may make this possibly more meaningful if you are interested in that.

I hope we won't let the accouterments or indicia of the vast bureaucracy we represent here from the States, the Federal Government, and the interstate agencies get in the way of the essential problem that we are dealing with--Representative Mikva outlined that--to identify the sources and kinds of pollution in Lake Michigan and try to devise methods of coping with them.

Mr. Klassen.

MR. KLASSEN: Mr. Chairman, privately I have requested, and I again want publicly to ask, all of the participants to please be as brief as possible. Time is extremely important.

One of the largest users from a recreational standpoint on Lake Michigan is the Chicago Park District, which has a real interest in the recreational quality of the water.

Mr. John Trinka is going to give the Chicago Park District Presentation.

STATEMENT BY JOHN M. TRINKA
DIRECTOR OF SPECIAL SERVICES
CHICAGO PARK DISTRICT

MR. TRINKA: Mr. Chairman, conferees and ladies and gentlemen.

The Chicago Park District has about 22 miles of lakefront on Lake Michigan that has served millions of persons annually with the recreational facilities we have in this area. We have 30 beaches, bathing beaches, 7 harbors, 7 launching ramps, many fishing piers, and miles of sea wall that are made into fishing areas.

We have 2,400 boats assigned to moorings in our harbors. These range from 20 feet to about 103 feet, and about 2,500 outboard motor boats up to 20 feet use our launching ramps. We moor approximately 700 out-of-state visiting boats.

I would estimate that about 1,600 of these boats have one or more heads aboard. Most of them flush raw sewage into the lake.

The City of Chicago passed a recent ordinance that will prohibit this. The Chicago Park District Commissioners are contemplating a similar ordinance. Subsequent to this new boating law, we worked with our engineering section to come up with the best solution of pumping out retention tanks that are connected to toilets on boats.

This spring plans are to have pumping stations located in each of our seven harbors. They will adequately service any boat that has a retention tank. Toilets that dump raw sewage, and do not conform with the new law must be eliminated or sealed.

Gentlemen, recently our lakefront waters have deteriorated at a fast rate. Just a few years ago our waters were much clearer and during the early spring harbor work, we could see thousands of minnows, bait minnows, fish swimming in our waters. Last season, I noticed the density of our water. Sea scum, a seaman's term for algae, was attached to our sea walls, made our launching ramps slippery and the bottoms of the boats that were moored they were thick with algae. This caused the boat yards quite a problem in cleaning the boats for their winter lay-up.

This algae problem was much greater this year than it has been in prior years. Talking to some of the old-time fishermen along our lake, I was informed that last year was the poorest fishing that they ever had. In fact, they told me that not one herring was caught in the past three years, and that the smelt and perch runs are very small.

My office as the Director of Special Services, signs permits for seining our harbors for bait minnows, but there are no longer any bait minnows in our harbors. This is because of pollution and alewives fish.

The alewives fish have caused the Chicago Park District a great problem, particularly last year which was at least fivefold over any prior years. Millions of them were washed up onto our bathing beaches. Our Landscape Division worked around the clock hauling hundreds of truckloads away, to be disposed of in trying to keep our beaches open.

JOHN M. TRINKA

Strangely enough, I talked to our Mr. Baker, our Director who is here personally,and he said that they have taken over a million pounds of alewives off of our beaches.

Our harbors were filled with them. In fact, gentlemen, I left a photograph showing you a picture of our Belmont Harbor. You can see the boat there practically swimming on top of the fish. Of course you can see a beer can also, which is a very bad thing for some of these boaters who are littering our harbors.

Many people did not use our beaches or our fishing areas or our harbors because of the stench.

Fortunately for us, these scavenger fish leave our shores sometime in August and they do not come back until the next spring. Unfortunately, from there on out we do have some smell because of these fish being buried in the sand, which makes swimming putrid and awful. Of course I heard Mr. Mikva make the statement here, and I absolutely was told that a young girl was on a floating raft and she made a scream and getting off they asked her what was wrong, and the raft was just loaded with maggots. So this is what is happening with our algae, what our algae are causing to our recreational divisions.

We have another problem, gentlemen. The freighters, sea freighters, many of our yachters have complained to me that they have seen these freighters dump garbage and debris overboard when they are several miles out. Some of this debris has floated into our harbors and beaches. Last year we had a tremendous amount of bunker oil that caused our park district a lot of trouble, particularly our beaches and our harbors. I conferred with the City Port Director. Since then much of the problem has been eliminated. Some of our pleasure boats are also violators of the litter law. We constantly are on the lookout for them. We want to eliminate this violation.

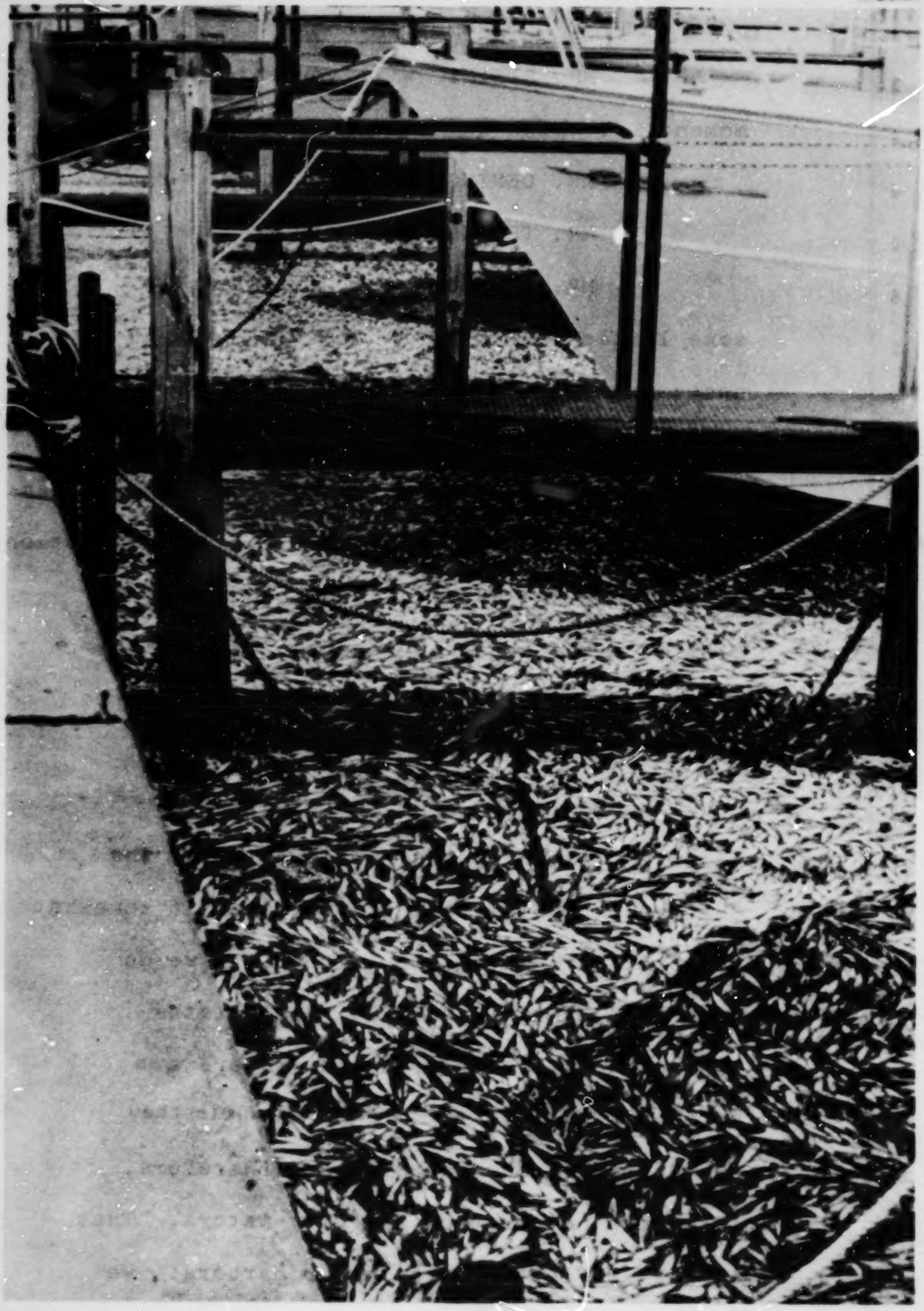
These alewife fish have a good nutrient value and should not be dismissed as a great pollutant. I urge this committee to give this alewives problem a hard look and study for some means to eliminate this scavenger fish from our waters. I know personally we use fertilizer that has fish element in it, so we do know there are nutrients in fish, and particularly the alewives.

On behalf of the Chicago Park District, may I thank this committee, the press and other media and the various committees for their efforts in saving our Lake Michigan so that the future generations can take advantage of our lakefront facilities just as millions of us did annually.

I thank you.

(Applause.)

(The photograph of Belmont Harbor referred to by Mr. Trinka follows:)



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MR. STEIN: Will you wait just a moment? I think we have a question.

MR. OEMING: Mr. Trinka.

MR. TRINKA: Yes, sir.

MR. OEMING: Will you clear up some little confusion in my mind? Why is it necessary for the park commissioners to enact an ordinance on this matter of waste disposal from boats when the City of Chicago has one here? Is there some question of jurisdiction?

MR. TRINKA: The Chicago Park District is a separate corporation from the City of Chicago. We naturally can help enforce the City ordinance, which we will do. But usually due to the fact that most of the lakefront is under the jurisdiction of the Chicago Park District, we then deem it somewhat necessary to have rules. Presently we do have a rule, it is Rule 19, that states regarding boats littering our waters are no heads, toilets are to be used while they are docked in our harbors. So, therefore, this does not protect the City waters. That is just while they are in our harbors. We want to change that over where it says no raw sewage that will be dumped overboard into the Lake Michigan waters in our areas, the City areas.

MR. OEMING: Do I understand, Mr. Trinka, then, that the ordinance that has been adopted by the City of Chicago does not apply to the waters that you have jurisdiction over here?

MR. TRINKA: That is quite right to a point, but that is, we are a separate political subdivision and we will then do everything possible to enforce this in our way. Also, I believe, our commissioners will have an ordinance of theirs.

MR. STEIN: What waters do these apply to?

MR. TRINKA: What is that?

MR. STEIN: What waters does the City ordinance apply to?

MR. TRINKA: Well, it applies to the waters in the City of Chicago. There is a technicality there that I will have to get to--

MR. STEIN: You have the map behind you. Can you indicate the scope of the waters under your jurisdiction and the City jurisdiction?

MR. TRINKA: There is a difference there because I do know, for instance, now, Meigs Field, which I understand some years ago that they petitioned the Park District to get permission to make up this Field, and then the park then turned this over to the City of Chicago. There is a technicality there and possibly our Law Department could explain this better than I can, but that part I do know, that there is a separation in corporations.

MR. OEMING: Mr. Trinka, the City of Chicago has a boundary line at the south and at the north here, I suppose. Now, does your boundary of the Park District run concurrently with the City of Chicago boundary lines?

MR. TRINKA: Yes, we do. About most of the lakefront is under the Park District jurisdiction. We have our parks in along the lakefront, such as Lincoln Park, Grant Park, Jackson Park, and they do run into the City of Chicago areas. But these parks again, as I say, are under the jurisdiction of our park commissioners. These commissioners are appointed by law, the Mayor of the City of Chicago appoints the park commissioners for certain terms, I believe a term of five years each.

MR. OEMING: Well, I think I am probably a little more confused than I was when I started to ask the question.

(Laughter.)

I am trying to find out here who has jurisdiction to regulate boat pollution in the Chicago Park District.

MR. TRINKA: The Chicago Park District has.

MR. OEMING: Does the regulation that the City of Chicago has adopted apply to the Park District?

MR. TRINKA: I believe it would.

MR. OEMING: I would like to have that answer. As a conferee, I think that we need to know this.

MR. TRINKA: Yes, I will get the answer for you after I talk to our Law Department, I will give you the answer on that.

MR. STEIN: I would hope that the ordinance would apply to all the waters under your jurisdiction, because again, and I speak personally as a lawyer and having lost cases on jurisdictional matters, I know the best laws in the world can't do a thing for you. If you will just take one second, I will give an actual case I was involved in. I would like to do this off the record.

(Off the record.)

MR. STEIN: Let's go back on the record.

MR. TRINKA: Is that all?

Thank you.

MR. STEIN: Mr. Klassen.

MR. KLASSEN: I think, as most of you who are familiar with Chicago know, that a large section of the Illinois Lake Michigan shoreline is under the jurisdiction of the Metropolitan Sanitary District of Chicago, which has already removed wastes from Lake Michigan.

The other sector on the shoreline is from the Cook County line north to the Wisconsin line. This is all under the jurisdiction of another sanitary district, the North Shore Sanitary District. We hear a lot of talk about what should be done, what the long-range plans are.

I want to call on the Manager of the North Shore Sanitary District. I am sure he is going to outline not some vague ideas or long-range plans, but something that definitely is being proposed, even to the point of money, by the North Shore Sanitary District.

Mr. Anderson.

STATEMENT BY RAYMOND E. ANDERSON
GENERAL MANAGER
NORTH SHORE SANITARY DISTRICT
CHICAGO, ILLINOIS

MR. ANDERSON: Mr. Chairman, distinguished conferees, ladies and gentlemen.

RAYMOND E. ANDERSON

In the interest of time and to prevent repetition, I will omit the first two paragraphs of my presentation and begin reading in the middle of page one.

(Which first two paragraphs are as follows:

(Americans everywhere are demanding a halt to water pollution. The be-fouling of our water, perhaps our greatest natural resource, must cease. No longer do we have unlimited supplies, such as Lake Michigan, to do with as we please. Our great lake must not go the way of Lake Erie, which is sometimes referred to as being "dead". The demand for fresh, pure water is mounting, as more and more is used by our homes, our commercial establishments and our industries.

(Obviously, the used water must be disposed of in such a manner as to prevent pollution or degradation of the receiving waters. Former methods, that were entirely acceptable, are fast becoming obsolete in the light of new standards set forth by Federal and State water pollution control agencies. Practices that were once routine or standard can no longer be tolerated. The demands of the public and of our water pollution control agencies are such as to rule out disposal methods once considered entirely adequate.)

MR. ANDERSON: For many years the Trustees of the North Shore Sanitary District have focused their attention upon the problem of providing adequate sewage disposal facilities, with the expectation that most, if not all, effluent must eventually be removed from the lake. Following a successful bond issue in 1953, a comprehensive program of improvements and additions to existing facilities was undertaken. New construction was barely completed when it became apparent that additional planning should be undertaken.

Accordingly, in June 1960, the Board authorized our consulting engineers to begin a study of our future needs. Their report, presented in May 1963 included the following consideration of population growth, sewage quantities, facilities required, future boundaries, and the effect of annexations. The first serious consideration of the abandonment of the small lakefront plants at Lake Bluff, Lake Forest, and Highland Park, with diversion of the flow from Lake Michigan to the East Branch of the North Fork of the Chicago River, was set forth.

This report was discussed in detail with Clarence W. Klassen, Technical Secretary, Illinois Sanitary Water Board, in October 1963. Mr. Klassen agreed with the recommended plan of abandonment of the small lakefront plants, but expressed concern over the possible effect adoption of such a plan at that time would have on the so-called "Diversion Suit." With this in mind, Mr. Klassen advised the District to defer adoption of the project until the "Diversion Suit" was settled. At the same time, he complimented the Board on being foresighted and expressed the opinion that the long-range plan proposed by the North Shore Sanitary District would eventually be carried out.

In December 1965 the Trustees of the

District instructed their engineers to review and update the May 1963 report and to broaden its scope.

Concurrently, the Board was becoming more concerned with the effects of stormwater discharges into the municipal sanitary sewers tributary to the District interceptors and treatment works. The Board set forth its position with regard to stormwater in an open letter to the editor of the Waukegan News-Sun in September 1965.

This was followed, in October of the same year, by an invitational meeting attended by municipal and governmental officials from throughout the District. At this meeting the District pointed out the undesirable results of stormwater infiltration into the sewerage systems and the effect upon the sewage treatment works. The municipalities were challenged to undertake a program of sewer rehabilitation and ordinance enforcement, to prevent hydraulic overloading of the treatment works and subsequent pollution of Lake Michigan.

A similar meeting, held in June of

1966, has been followed by concrete action on the part of most of the municipalities within the District. This action has included a bond issue, a sewer tax, smoke testing, and a special assessment program.

The Board's awareness of the need for extended and enlarged facilities and its desire to divert the small plant effluents from Lake Michigan was shared with the public through widespread news releases in April 1966.

The first official mention by the Sanitary Water Board that the small lakefront plants would either have to be upgraded to a higher degree of treatment or abandoned was contained in a June 1966 letter on beach sampling. In response to a request from the District for clarification of the Sanitary Water Board position, C. W. Klassen then stated in November that it "will be necessary that all sewage receive at least secondary treatment, in addition to adequate effluent disinfection. This must be accomplished by additional or replacement facilities in operation within five years (i.e. by July 1, 1972)."

Subsequently, the Sanitary Water Board stated that it "is therefore strongly recommended that immediate plans be made to divert all sewage or all effluent."

It should be pointed out that the District has always met or exceeded the State requirements for treatment facilities. A letter from C. W. Klassen in January of 1967 stated that "the North Shore Sanitary District currently has the degree of treatment that has been required by the Sanitary Water Board... the need for providing additional treatment is a fact that has been recognized by the District, as evidenced by its studies."

In the meantime, the "Diversion Suit" was drawing to a close. In December 1966 Judge Albert B. Maris, Special Master for the U. S. Supreme Court, presented his comprehensive report to the Court. This contained findings of fact, conclusions, and a recommended decree, which was adopted by the Supreme Court in June 1967. This decree provides that northeastern Illinois may divert no more than 3,200 cubic feet per second of water away from Lake Michigan for purposes of sewage treatment, stormwater runoff and navigation. The Court further stated that "there are feasible means reasonably available to improve water quality and to conserve and manage the water resources of the region."

In May of 1967, the Division of Waterways of the Illinois Department of Public Works and Buildings was designated by Governor Otto Kerner as the agency to receive and act on requests for allocation of water under the Supreme Court decree. Immediately following this designation, the District made application for enough water to permit diverting the lakefront plants away from Lake Michigan.

The District's desire to abandon the small lakefront plants was expressed in testimony before the Corps of Engineers in February of 1967, before the Illinois Technical Advisory Committee on Water Resources in May 1967, before the Illinois Water Pollution and Water Resources Commission in August 1967, and, most recently, before the Northern Illinois Water Resources and Conservation Commission November 8, 1967.

RAYMOND E. ANDERSON

Two recent developments are significant to the District. First, the Illinois House of Representatives, meeting in special session in October of 1967 passed a resolution "that we strongly urge the North Shore Sanitary District to inaugurate programs which will enable them to cease depositing domestic sewage from primary treatment plants in Lake Michigan by December 31, 1968."

Second: The District received its engineer's report in completed form in November 1967. A preliminary report, made public in May 1967, has been updated to take into account the following developments:

1. The effect of stormwater problems on existing facilities of the District.
2. The feasibility of providing service to lands adjacent to the District.
3. The effect of the possible annexation of these lands to the District.
4. The Federal Water Quality Act of 1965.
5. Illinois Water Quality Standards

and Minimum Treatment Requirements and Stormwater Treatment.

6. The Botanic Garden at County Line Road.

7. The Report of Special Master Judge Albert B. Maris pertaining to the so-called "Diversion Suit."

8. The development of subdivision and municipal sewer systems.

9. Sludge disposal.

10. Complete diversion.

Based on this Report the District has adopted an immediate and long-range plan, with four major goals as follows:

1. Diversion from Lake Michigan by means of pumping stations and force mains of the effluent from the small treatment plants on Lake Michigan, at Lake Bluff, Lake Forest, and Highland Park. This will also include all stormwater overflow.

2. Diversion from the Chicago River system by means of a pumping

station and force main of the Clavey Road plant effluent to the Des Plaines River.

3. Diversion from Lake Michigan by means of a pumping station and force main of the Waukegan plant effluent to a new tertiary treatment plant in Gurnee, with effluent discharge to the Des Plaines River.

4. Diversion from Lake Michigan by means of a pumping station and force main of the North Chicago plant effluent to the Gurnee tertiary treatment plant, with effluent discharge to the Des Plaines River.

In a letter to the District dated December 21, 1967, C. W. Klassen stated that accomplishment of these diversion goals "will completely meet the Lake Michigan Water Quality Standards recently adopted by the Sanitary Water Board." He further stated that, "This solution will meet the need to protect the public beaches to the fullest extent and minimize nutrient discharge to Lake Michigan," and that, "This solution will meet the intent and requirements of the State of Illinois regarding allocation of Lake Michigan diversion." He also stated that, "The combined project will coordinate with the State plan for water resource development in this area."

The plan adopted by the District includes the following auxiliary works:

1. A new secondary treatment plant in Gurnee to treat sewage from North Chicago, the upper Skokie Valley, and Gurnee before discharge into the teritary plant on the Des Plaines River.

2. A reservoir at Clavey Road to receive and store excess stormwater overflows diverted from the five lakefront plants. When the storm flow subsides the contents of the reservoir will be discharged to the Clavey Road plant for secondary treatment.

3. A polishing lagoon and chlorination facilities for effluent disinfection at the Clavey Road Plant.

4. A reservoir at North Chicago to receive, settle out, and treat with chlorine stormwater overflows before discharge to Lake Michigan.

5. A similar reservoir at Waukegan.

6. Stormwater sedimentation tanks and chlorination facilities at Highwood, Winthrop Harbor, and Zion.

7. An extension of the Winthrop Harbor interceptor from Ninth Street northward to Third Street.

8. A parallel sewer to reinforce the Zion to Waukegan interceptor.

9. A parallel sewer to reinforce the Waukegan to Highland Park Skokie interceptor.

10. Additional treatment facilities at the existing secondary

plants at Waukegan, North Chicago, and Clavey Road.

11. Sludge dewatering facilities at the Clavey Road and Waukegan plants, with possible sludge incineration for both plants at Waukegan.

The entire project is estimated to cost approximately $58,000,000, of which about $35,000,000 can be financed by the issue of general obligation bonds, with the balance to come from State and Federal grants.

The District welcomes the spotlight on its plans, for this fosters public awareness of the problem and the extent to which the District is attempting to solve it. It further points up the public responsibility to pay for the improvements it demands. We are prepared to go as far as necessary to prevent pollution of Lake Michigan, so long as we have the financial backing of the voters.

We are planning a referendum on May 4 to secure voter approval of a $35,000,000 bond issue. We anticipate a favorable vote, in light of today's stringent requirements and the demands of an enlightened public.

MR. STEIN: Thank you.

Are there any comments or questions?

Mr. Holmer.

MR. HOLMER: Mr. Chairman, Mr. Anderson's report was a very interesting and exciting, forward-looking one.

However, I am still nervous, and I wonder if the conferees could have a water budget for this 3,200 cubic feet per second, that looks to the year at least 1980 if not 2000 or some years in that period, which takes into account the increased anticipation of per capita consumption of water. This appears to be a feasible and desirable course of action to be taken by the North Shore Sanitary District at this time.

I just want to be sure that the water is accounted for and will meet the needs through the next generation.

MR. STEIN: Yes. I think your concern is well taken, but I raise the question, and the conferees might think about this, whether this is the forum to get at that.

I think we are dealing with water quality and as you know in the long history of the States around Lake Michigan, when you deal with allocations of water or taking the water out and putting something in the lake, this has been the subject of much court action.

MR. HOLMER: I would certainly agree with you that I don't want to re-raise the whole legal question of the diversion.

On the other hand, what has been presented here is one of the alternative ways of reducing the pollution of Lake Michigan, and I want to be sure that nothing that comes out of this conference stores up trouble for the next generation.

MR. KLASSEN: I might speak to Mr. Holmer's point there.

The Supreme Court has said, and I think we are the only State that it has said, you can take so much water out of the lake, the State of Illinois. It didn't say any particular subdivision, and it is up to the State of Illinois to allocate how much each particular entity will take out of the lake just so the total amount does not exceed 3,200 second feet. The problem that confronts the North Shore Sanitary District, if, for example, they remove 100 second feet from the lake and do not put it back, this 100 second feet has got to be deducted from the amount that the City of Chicago is now using or the Metropolitan Sanitary District of Chicago by some State agency that has not yet actually been named.

But I just want to reassure you, Mr. Holmer, that by these solutions of removing water from the lake and not putting it back, so far as the State of Illinois is concerned, we are limited to a total from here on of 3,200 second feet, and no matter how many of these plans are proposed we must live within that 3,200 second feet budget.

MR. HOLMER: I rather repeat my request for some idea of the anticipation of how you are planning to use that diversion in the next generation simply because there are limits to it and there are limits to this technique for dealing with the pollution problem. We face somewhat similar problems, as you may be aware, and the consideration of such an opportunity for, say, the City of Milwaukee, and the problem that confronts us there is one of, for one thing, how much could be diverted, how much litigation that would take, and then what would happen when population doubles and doubles again and whether there may not be a real problem that lies in the future.

MR. KLASSEN: He has raised a good point there, Mr. Chairman. I want to just comment on this a minute.

It has been advocated that wastes be removed from Lake Michigan. We in Illinois are very much concerned about the point that Mr. Holmer has raised, because if Milwaukee, for example, decides to do the same thing that the Chicago Sanitary District is doing and the North Shore Sanitary District proposes to do, the State of Illinois would be the recipient of the effluent from their sewage treatment plant, because they would go into streams that flow into the State of Illinois.

He has raised an interesting point and one, frankly--this isn't an official statement; it may be a personal reaction--I hope that in the interest of the State of Illinois that Milwaukee doesn't press this too soon, because we really don't care to be the recipient of Milwaukee's effluent. And the same situation applied to Indiana. It has been proposed, not by the State of Indiana, I would say, that all of the wastes in Northern Indiana be taken south away from the lake. Again these would come into Illinois through the Kankakee River.

And I am glad that Mr. Holmer raised these points, because this would be the subject of much, much litigation. But it is something that these conferees, I think, are going to have to face up to, because these proposals have been made.

MR. STEIN: Well, you know, we are off and running on this point. We are not going to cut off discussion, but you know, history repeats itself. With Illinois being the recipient I think reading historic public record will show you that as the

RAYMOND E. ANDERSON

aftermath of the great reverse of the flow of the Chicago River and the establishment of the canal, was the famous case of Missouri against Illinois litigated in the U. S. Supreme Court. You heard Mr. Jardine speak of these typhoid epidemics which were rampant then; the people in St. Louis had a little disease at the time; and once the waters began to flow down, they were the recipients of the water coming down from Illinois. They weren't very happy too and they took it to the Supreme Court.

I think once we talk in terms of getting water out of the lake and once we talk in terms of transbasin diversion, we are going to be faced with two things, either we are going to do it in the old way and litigate this in the Supreme Court or maybe you want to develop some plans with Mr. Clevenger and the Great Lakes Commission. That may be an alternate way.

But I think what we do is have some enticing vistas opened here, and while we are open for discussion I am not sure how definitive a conference of this kind with the limited powers that we have can be in resolving these issues. In the past these have been issues which have only been able to be resolved by decisions of the Supreme Court, and as you know, not all of them are unanimous. Some of them are pretty close.

MR. KLASSEN: Mr. Chairman, we have a very, very brief statement here.

MR. STEIN: Wait.

MR. KLASSEN: Oh, I am sorry.

MR. STEIN: Mr. Oeming has a comment.

MR. OEMING: I am not sure who should clear up this question, whether Mr. Johnson should or Mr. Klassen, but on page--

MR. KLASSEN: Which Mr. Johnson, Lyndon?

(Laughter.)

MR. OEMING: What is this man's name who was just on?

MR. STEIN: Anderson.

MR. OEMING: Anderson, I am sorry. Mr. Anderson.

MR. KLASSEN: They are all Swedes. (Laughter.)

MR. OEMING: On page 1368 in Mr. Anderson's statement, he says that the Division of Waterways of the Illinois Department of Public Works and Building has been designated by Governor Kerner as the agency to receive and act on requests for allocation of water under the Supreme Court decree.

As I understand Mr. Klassen, I think you said that nobody had been desig-- you weren't sure yet who was designated. Would you clear this matter up, somebody?

MR. KLASSEN: Well, the Department of Public Works has been designated, I understand, by Governor Kerner as the agency that currently has jurisdiction over this question, and I think that is where the matter stands. So far as I know, this is the agency in Illinois that will act upon this particular application and future applications.

I don't want to say this is still open

to some question, but I don't know, frankly, whether this has been completely resolved. I personally feel that that is the agency that has the authority and that will act on this.

I might say that in view of this, the North Shore Sanitary District has officially submitted an application to that agency, and I presume that when the Department of Public Works acts on this, if there is any legal question at that time, then the courts would decide.

But I would say to answer your question, Mr. Oeming, at the present time, the Department of Public Works is that agency until some other one is designated.

MR. STEIN: Mr. Klassen, did you have one more?

MR. KLASSEN: We had a very short one. We had a group here that we had hoped to get on, the North Shore, some of the water problems, but a very short statement here that I think is apropos at this time.

Illinois has a legislative pattern

of creating legislative commissions, and they have done an outstanding job in this regard, all of these commissions.

We have a legislative commission for Northern Illinois Water Resources and Conservation Commission problems. The Chairman of that Commission is here and he has promised to read only what he has submitted here, and if so, it is only going to take about two minutes.

Chairman Representative John Kleine.

Being a legislator, and being a State employee, I must say that I have always found Representative Kleine, as well as every one of the other legislators, to be a person of his word.

(Laughter.)

We have a group of promising legislators; they promise us anything.

(Laughter.)

STATEMENT BY JOHN HENRY KLEINE
STATE REPRESENTATIVE AND CHAIRMAN OF THE NORTHERN ILLINOIS WATER RESOURCES AND CONSERVATION COMMISSION

MR. KLEINE: Mr. Chairman and distinguished conferees.

As Chairman of the Northern Illinois Water Resources and Conservation Commission I wish to congratulate both Secretary Udall and our Illinois State agencies for calling this very timely conference. I should like to interject a moment of congratulations to the North Shore Sanitary District for their very progressive effort and their vision and their courage with this very ambitious plan.

Our Commission, which deals with water and conservation problems in the entire northern part of the State of Illinois from Lake Michigan to the Mississippi, is vitally interested in saving Lake Michigan.

Through the efforts of our Commission, the State agencies, and the Illinois State

Legislature, the State of Illinois has assumed leadership in the field of the war on pollution of Lake Michigan among its sister States.

Even now, the North Shore Sanitary District is ready to implement a $57,000,000 water treatment program which will remove all discharge into Lake Michigan. This will then compliment the fine job and the excellent performance of the Chicago Metropolitan Sanitary District, under Vinton Bacon, and the Chicago Department of Sewers and Water, under Commissioner James Jardine, in their efforts to clean up Lake Michigan.

If all the participants in this conference believe in the philosophy that Lake Michigan shall be our great fresh water reservoir, and everything shall be done to achieve this goal, then Illinois has been the leader. It is now up to our neighboring States to confirm this position. The time of decision is here and there can be no compromise.

The States must act in uniformity on boating laws, dumping of materials, establish uniform water criteria for the entire lake;

eliminate the discharge of all polluted effluent into the lake; and most important, gentlemen-- I think this is the first time I have heard this--establish State scholarships in their respective universities toward developing more trained sanitary research engineers; establish cooperative programs to restock the lake with fish for which it was once famous.

May I say that I would like to compliment my sister State of Wisconsin, Freeman Homer and Ted Wisniewski, for the very fine rapport that our Commission has had at all times with the Wisconsin Commission.

Thank you.

MR. STEIN: Thank you, Representative Kleine.

Any comments or questions?

Mr. Klassen.

MR. KLASSEN: I know, Mr. Chairman, our allotted time for this afternoon for Illinois is up so that we may hear from some Federal agencies. I made a promise to Senator Paul Simon, who promised me he would only take five minutes. He can't be here next week.

And I would like to take another five minutes if I can for the Navy.

As a matter of fact, I think he is an old Navy man anyway.

MR. STEIN: All right. Will you come up?

As you know, we have ready speakers in Washington too that are expert at speaking within their five-minute limit. But one time one of these Congressmen went to the Mayflower Hotel, got there the wrong night and found a woman's group waiting in the room, never heard of them, but they were without a speaker. Pretty soon they arranged a happy marriage. They asked him if he would speak and he spoke to the group.

The press heard about this, were intrigued with the story, got the Congressman and one of those women's page reporters, I guess, said to him, "But Congressman, what did you speak about?" He said, "Oh, about a half hour."

(Laughter.)

MR. KLASSEN: Mr. Chairman, you have already used up three minutes of his time.

(Laughter and applause.)

PAUL SIMON

MR. STEIN: This morning I discovered what a Southern Illinois three minutes is.. (Laughter.)

STATEMENT BY PAUL SIMON
STATE SENATOR, 53RD DISTRICT
STATE OF ILLINOIS

MR. SIMON: Mr. Chairman, Mr. Klassen, distinguished members of the conference and friends.

The first portion of my statement simply thanks Governor Kerner and the officials here for calling the conference, urges steps that can be taken to make enforcement of our pollution laws, make possible a little faster action on the enforcement of our pollution laws, and then in addition to talking about ways of cleaning up our water I believe we must broaden our concerns--first to discuss new and creative ways of getting maximum recreation benefit from our water resources, and second, to consider the whole water problem of the area as it relates to Lake Michigan. Here in Illinois the great majority of those people living in the Chicago Metropolitan area are in the peculiar position of drawing their water from the lake and returning it, as waste, to the Illinois River. It is accomplished by 52 miles of canals that took over 30 years to complete. Some communities along the North Shore are today actually building new sewers to direct more sewage into the Illinois River, all in the name of cleaning up Lake Michigan. I urge this conference to put a stop to attempts to solve one problem by merely transferring it to another area.

As to looking for better ways to receive the maximum benefit from our lake, I like that creative, imaginative spirit which caused us to fill in the lake east of Michigan Avenue to form Grant Park, and the spirit that reversed the flow of the Chicago River.

What is needed today for Lake Michigan is not just a defensive complex but an offensive dream.

Just as one possibility, let me suggest a practical plan--and I have the maps here that have been worked on by people from the University of Illinois and the University of Chicago--practical plan which would consider the recreational need of the seven million who presently reside in the Greater Chicago area and the greatly increased population which we will have fifty years from now, which some experts believe may be double the present figure.

This plan would call for the building of a chain of islands which would extend into the lake starting at 79th Street and stretch in a graceful arc about 25 miles east to Burns Ditch.

The lake side of the islands would constitute recreation zone for bathing, hiking, sight-seeing and boating.

The inner side would be equally appropriate for sight-seeing and would also form, with the current lakeshore, a zone for pleasure boating, industrial and transportation use.

This latter zone incidentally would, for the first time, allow year-round barge navigation where, because of high winds and wave action, only about 100 days per year is possible now. Also since the Metropolitan Sanitary District needs a place for surface reservoirs for their Deep Tunnel project, they could use this zone for that purpose.

A scenic causeway, showing Lake Michigan on one side and our giant industrial plants on the other, would run the full length of the island chain. At each end gates would allow the passage of boats. These gates, coupled with the O'Brien Lock and Dam, would keep this zone slightly lower than the lake itself.

From where would the materials come from? They are right under our feet today. Indeed, they are a great problem where they are and must be removed at great cost. I refer to the 60 million cubic yards of rock that will be removed in the Metropolitan Sanitary District Deep Tunnel project and the almost equal amount of impermeable clay that must be removed before our new subway plan can be implemented. These materials, rock and clay, would form the base and outer edge of the islands. The hollow center could be filled in with the slag that threatens to strangle our major steel producers.

The cost of building the islands is approximately one billion dollars. That's about $1.50 per square foot. Today, much less valuable beach front is selling for considerably more. And these islands would produce revenue. Six thousand to twelve thousand pleasure boats could easily moor there to produce more than $750,000 per year, just as one example. Revenue also could come from steel companies for depositing slag there. Other examples could be given.

We would have the option of paying for the islands from present governmental revenues or by issuing revenue bonds, or a combination of both.

The contribution such a chain of islands would make to recreational, cultural and industrial progress in this area is beyond calculation. Its cost would be but a fraction of the added value it would bring to the area, a small part of the annual industrial addition to the region, and it would give much of the lake back to the people to whom it belongs.

Such a plan obviously would need the

approval of the City of Chicago, the two States involved, the Federal Government and other governmental units.

One of our Nation's philosophers suggested in a new book that what our Nation lacks today more than anything else is imagination and the pioneering spirit which symbolizes our country to much of the world.

My hope is that his criticism will not be applicable to those of us who look to the future of Lake Michigan. Yes, we want to solve the problem of alewives. Yes, we want to stop pollution of the lake. But let us add one more affirmative. Yes, we want to make no little plans for making the lake an even greater asset to the people of our Nation.

In 1909 Daniel Burnham said, "Make no little plans; they have no magic to stir men's blood and probably themselves will not be realized. Make Big Plans. Aim high in hope and work, remembering that a noble logical design once recorded will never die, but long after we are gone will be a living thing, asserting itself with growing intensity.

I will be happy to try and answer any questions, Mr. Chairman.

MR. STEIN: Are there any comments or questions?

If not, thank you very much.

MR. SIMON: Thank you.

(Applause.)

(The entire statement of Senator Simon is as follows:)

GENERAL ASSEMBLY

STATE OF ILLINOIS

PAUL SIMON

State Senator 53rd District

Troy, Illinois

62294

Member of Committees on:

Education
(Minority Chairman)

Agriculture

Conservation

Public Welfare

Rules

Secretary
Illinois Legislative
Council

Advisory Committee
on Tourism

School Problems
Commission

PAUL SIMON

For further information,
contact:
Mrs. Jeanne Sullivan
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STATEMENT BY SENATOR PAUL SIMON TO THE
FOUR STATE CONFERENCE ON LAKE MICHIGAN
Sherman House, February 2, 1968

* * * *

I greatly appreciate the opportunity to address you. I also want to commend Governor Kerner for calling this conference and for the courage and energy that he has given to what promises to be a long and tiring fight against pollution.

I can see that we all agree that our water quality is inadequate and getting worse. We can also agree that no improvement can come without using improved waste treatment methods.

I regard this conference as a test of whether the present legislative scheme for controlling pollution really can work. If this conference cannot take concrete and immediate steps to eliminate the obvious problem areas, then we ought to consider legislation to hasten procedures for cutting off pollution. The present enforcement procedure under the Federal acts is cumbersome, it requires a long period of time, and it contains many built-in possibilities for delay, confusion and inaction while serious pollution continues unabated. If the present procedure cannot work, Congress must consider: one, changing the hearing board from an ad joc board to a permanent administrative board; two, cutting down the time allowed to polluters for compliance with the recommendations of conference like this one; three, cutting down the time between a conference and the convening of a hearing board. These are, however, only a set of suggestions for changes that would help the Federal Water Pollution Control Administration to effect what we all recognize as essential work.

However, in addition to talking about ways of cleaning up our water, I believe we must broaden our concerns:

First, to discuss new and creative ways of getting maximum recreational benefit from our water resources; and

Second, to consider the whole water problem of the area as it relates to Lake Michigan.

Here in Illinois the great majority of those people living in the Chicago Metropolitan area are in the peculiar position of drawing their water from the lake and returning it, as waste, to the Illinois River. It is accomplished by 52 miles of canals that took over 30 years to complete. Some communities along the north shore are today actually building new sewers to direct more sewage into the Illinois River, all in the name of cleaning up Lake Michigan. I urge this conference to put a stop to attempts to solve one problem by merely transferring it to another area.

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FEDERAL PRESENTATION (CONTINUED)

MR. STEIN: Mr. Klassen.

MR. KLASSEN: Mr. Chairman, I want to say that Illinois has used up about eight minutes more than the time that you allotted, and I just want to suggest to all of the Illinois participants that I said would be on this afternoon, if you would congregate at a place of your choice for dinner, I will not be there, but you can call the Illinois Conferee anything you care to and you may report on your findings Monday morning when I am here.

I apologize again, but those of you who have run meetings know what some of the problems are, and I have already now taken 10 minutes.

I want to turn this back as promised

FEDERAL PRESENTATION (CONTINUED)

to the Federal people and the Chairman for their presentation the rest of the afternoon.

I want to say that the other part of the Illinois presentation, the first thing Monday morning when we reconvene, will be the City of Chicago Water Department, next the Chicago Sanitary District presentation, and then all of those that were not able to be on today.

MR. STEIN: Thank you, Mr. Klassen. I will say, I enjoyed those 10 minutes. It was like a Beethoven symphony. Every time I thought it was going to end you came up with another fanfare.

(Laughter.)

Mr. Poston.

FEDERAL PRESENTATION (CONTINUED)

MR. POSTON: I would like to at this time to call on Captain George R. Shepard, Midwest Division of the Naval Facilities Engineering Command, located at Great Lakes.

While he is coming up, is Captain

Riblett here?

CAPT. SHEPARD: He went back. I will introduce his paper.

MR. POSTON: All right.

COMMANDANT, NINTH NAVAL DISTRICT STATEMENT
FOUR-STATE WATER POLLUTION CONFERENCE
31 JANUARY 1968
PRESENTED BY
CAPTAIN G. R. SHEPARD, CEC, USN
DISTRICT CIVIL ENGINEER

CAPT. SHEPARD: Mr. Chairman, distinguished conferees, ladies and gentlemen.

I appreciate the opportunity to present on behalf of the Commandant of the Ninth Naval District, Rear Admiral H. A. Renken, information which will indicate the extent of the Navy's participation in this all-important campaign to reduce water pollution.

We maintain close contact and coordinate our efforts with the various Federal, State and local organizations. While we are not a major contributor to the overall problem, we have taken certain steps in the form of (1) accomplished minor projects, and, (2) planned future projects which will control pollution in the manner specified by applicable criteria. My presentation does not cover steps which are being taken by the Naval Ships Systems Command to control pollution by ships while operating on the lake proper. This subject will be covered by Captain Riblett.

Both of the sewage treatment plants at Great Lakes provide secondary treatment to the effluent. Under normal operating conditions the effluent from these plants meets current criteria. At our Lake Michigan plant we do have a future problem involving peak loading and the disposal of water and boiler plant wastes. A military construction project designed to remedy these deficiencies was submitted several years ago. It is presently programmed for fiscal year 1970. When funded and completed it will enable the Navy to meet expected water quality criteria for Lake Michigan up to 1977.

A Navy program for the installation of tertiary treatment will depend on the outcome of the program under development by the North Shore Sanitary District providing for inland pumping to other watersheds. The state of the art 10 years from now may very well dictate that the desired results may be obtained by means more economical than the pumping of 5 to 6 million gallons per day to another system. A second military construction project for either pumping or tertiary treatment will be required to comply with the 1977 criteria.

This last summer we completed a sewage collection system at the Naval Training Center which accommodates the small ship homeported there and discharges the waste into our sanitary system. A plan solving a long standing problem at the Chicago Naval Armory and its training ship has been developed recently in conjunction with Federal,State and local agencies. Funds will be granted in the near future which will provide the

Navy's share of the combined project to collect the sewage discharge from the USS Parle. Additionally, this project will accommodate various privately-owned small craft, utilizing the Monroe Street Harbor and the Naval Armory itself. Sewage will be delivered to the city sanitary sewer system.

In conclusion, it is our aim by close coordination and liaison with all agencies concerned, to develop and maintain Navy facilities which will comply with applicable water quality standards of the States and surrounding communities.

STATEMENT OF THE NAVAL SHIP SYSTEMS COMMAND
PRESENTED BY
CAPTAIN GEORGE R. SHEPARD

CAPT. SHEPHARD: The second paper is one prepared by the Naval Ship Systems Command. Essentially it briefs a formal document known as Senate Document No. 48 that is available through the Government printing establishment. I will skip the part which is paraphrased and take up the last three paragraphs, which essentially deal with the efforts of Ship Systems Command to install treatment facilities on the various Naval ships.

(Reading) A three-phase development contract was awarded in May 1966. The first phase established system feasibility by means of a laboratory model, and the second phase produced a full-scale prototype which is now undergoing evaluation at a Navy laboratory. A second full-scale unit is being installed in an Atlantic Fleet destroyer for shipboard evaluation of operating and maintenance concepts.

While preliminary tests of this developmental plant indicate that it will meet or exceed the effluent standards specified in the contract, it was not designed to meet the very stringent water purity standards which have been established by the Illinois Sanitary Water Board. There is no known equipment either available or under development which will meet these standards and still meet the critical weight and space requirements of a

Naval ship installation.

The only apparent method by which Naval Reserve Training ships berthed in the Chicago area can meet the Illinois purity standards is by re-plumbing the sewage drains into holding tanks from which the wastes may be pumped ashore into a sewer main. Naval authorities are now evaluating the cost of such installations, as well as the effects on the operations of the ships involved.

Mr. Chairman, I would like to have this paper introduced for the record.

MR. STEIN: Without objection, this will be introduced in its entirety as if read.

(Which said paper is as follows:)

Program for Treatment of
Shipboard Wastes from U. S. Navy Ships

The Federal Water Pollution Control Administration Report to the Congress dated August 7, 1967 entitled "Wastes from Watercraft," which has been reprinted as Senate Document No. 48, contains a brief description of the Navy's program for shipboard waste disposal. This paper will summarize the salient points of that program, which has as its aim the treatment of shipboard sewage to produce an effluent which will meet the criteria listed in the Public Health Service Handbook of Sanitation for Vessel Construction. It will also cover briefly the particular requirements imposed upon Naval ships when moored or operating in the waters of the Chicago Metropolitan Sanitary Water District.

As noted in the above cited FWPCA report, Naval ships pose special design problems because damage control features of all systems are important design considerations, and penetration of watertight decks and main watertight bulkheads must be minimized. For that reason as well as economy of ship construction and maintenance, normally all waste drainage systems are gravity systems discharging directly overboard with minimum internal piping.

In developing a program to provide a satisfactory solution to the Naval shipboard sewage disposal problem, existing shipboard sewage treatment systems were evaluated. The system that has found the most widespread acceptance in commercial shipbuilding circles is the extended aeration, activated sludge process. The fundamental feature of the unit is a system of continuous aeration of the organic material in an aeration chamber with no other sludge digestion required. The increase in space and weight requirements of this system make it unattractive for Naval shipboard use.

To illustrate this, the following compares the space-weight relationships for two ship types:

	Guided missile frigate	Aircraft carrier
Treatment units required	4	22
Deck area (square feet)	550	4,500
Weight (tons)	30	250

In addition to the adverse penalties imposed on the ship, operating experience has indicated that treatment efficiency has been marginal and sludge-holding facilities are not being recommended.

In the absence of factual data on ship sewage characteristics and treatment hardware adaptable to Naval ship use, Naval Ship Systems Command (NAVSHIPS) undertook a comprehensive research and development program. The first phase of this program was a waste survey in representative areas in each of four different type ships.

The U. S. Navy Marine Engineering Laboratory, Annapolis, Maryland, conducted this survey and findings are reported in "U.S. Navy Marine Engineering Laboratory Research and Development Report 346/64, January 1965."

Using the results of the waste survey as a characteristic influent and the proposed effluent standards of the interagency committee as the treatment goal, NAVSHIPS contacted industry to develop the required system hardware.

A three-phase development contract was awarded in May 1966. The first phase established system feasibility by means of a laboratory model, and the second phase produced a full-scale prototype which is now undergoing evaluation at a Navy laboratory. A second full-scale unit is being installed in an Atlantic Fleet destroyer for shipboard evaluation of operating and maintenance concepts.

While preliminary tests of this developmental plant indicate that it will meet or exceed the effluent standards specified in the contract, it was not designed to meet the very stringent water purity standards which have been established by the Illinois Sanitary Water Board. There is no known equipment either available or under development which will meet these standards and still meet the critical weight and space requirements of a Naval ship installation.

The only apparent method by which Naval Reserve Training ships berthed in the Chicago area can meet the Illinois purity standards is by re-plumbing the sewage drains into holding tanks from which the wastes may be pumped ashore into a sewer main. Naval authorities are now evaluating the cost of such installations, as well as the effects on the operations of the ships involved.

LEAGUE OF WOMEN VOTERS OF UNITED STATES

MR. STEIN: Mr. Poston.

MR. POSTON: At this time I would like to call on Mrs. Donald Clusen, League of Women Voters. She represents the National headquarters.

Mrs. Clusen has been very patient. Mrs. Clusen had asked for quite some time; I think she inquired of the State of Wisconsin, also, since she is a resident of Green Bay.

Mrs. Clusen.

LEAGUE OF WOMEN VOTERS OF THE UNITED STATES
MRS. DONALD E. CLUSEN, DIRECTOR
AND WATER RESOURCES CHAIRMAN

MRS. CLUSEN: Mr. Chairman and distinguished Conferees, I might say seldom has a woman had so much trouble getting a word in edgewise.

(Laughter.)

However, I am most grateful for the time and I will summarize the statement which is now in the hands of the Conferees and the reporter.

In order to clarify my status here, let me say that although I live in Green Bay, Wisconsin, I am National Water Chairman for the League of Women Voters. I am here today, however, as spokesman for the ladies in the four States who are a party to this conference, so the views which I am presenting here are those of the Lake Michigan interleague group.

In addition to that, I would like to request permission of the conference for the detailed statements from these State leagues to be entered into the record of this conference following our testimony.

MR. STEIN: Are they ready now?

MRS. CLUSEN: Yes, they are in the material which you have just received.

MR. STEIN: Without objection, they will be introduced into the record as if read.

(Which said statements are as follows:)

LEAGUE OF WOMEN VOTERS OF THE UNITED
STATES, 1200 Seventeen Street, N.W.,
Washington, D. C. 20036

STATEMENT TO THE FEDERAL-STATE ENFORCEMENT CONFERENCE ON POLLUTION IN LAKE MICHIGAN AND ITS TRIBUTARY BASIN, BY

LEAGUE OF WOMEN VOTERS OF UNITED STATES
MRS. DONALD E. CLUSEN, DIRECTOR
CHAIRMAN, WATER RESOURCES COMMITTEE
LEAGUE OF WOMEN VOTERS OF THE
UNITED STATES, February 1, 1968

I am Mrs. Donald E. Clusen, of Green Bay, Wisconsin, Water Resources Chairman of the League of Women Voters of the United States. I am here today as a resident of the Lake Michigan Tributary Basin to express the views of local and State Leagues of Women Voters in this four State area. Leagues in these States have joined together to study and seek solutions to water problems which plague the Lake Michigan Region, and the views which I will present to you are those of the Lake Michigan Inter-League Water Group. In addition to this overall presentation, the State Leagues of Indiana, Illinois, Michigan and Wisconsin have prepared individual statements in greater detail regarding the situation as they find it in their part of the Lake Michigan shoreline. At this time, we would like to request permission of the conferees for these four statements to be entered into the record of this conference, following my testimony for the Inter-League

Group of the Lake Michigan region.

We think it is significant that the Leagues of Women Voters in these four States have chosen to work jointly in their efforts to gather information and reach decisions on present and future pollution abatement efforts concerning Lake Michigan. We believe it is even more important that these four States approach the growing problems of Lake Michigan in the same spirit of joint endeavor.

We wish to use this opportunity to urge both the Federal Government and the States to look at Lake Michigan as a whole-- to see beyond the most urgent crisis of water quality to consideration of such other problems as navigation, water supply, water use and reuse, eutrophication, land fill and procedures for dumping and dredging. We wish to commend the calling of this conference, which we previously urged through letters to Governors of the States, as an important step in achieving greater unity of purpose among these States and between them and the Federal Government.

LEAGUE OF WOMEN VOTERS OF UNITED STATES

We note also another encouraging factor in the stated intent of the four Attorneys General to compile and exchange lists of known polluters in these States.

Few citizens can doubt the wisdom of wholesale, joint attack upon our problems. A piecemeal approach on a single problem basis can only lead to inconsistency, inadequacy, and confusion. Each State is obvioulsy affected by the discharges of its neighbors, intrastate standards set for water quality, handling of the increasing alewife problem, and local and State regulations which govern dumping of polluted materials in our common waterway.

From observation, research, and discussion, including pooling of information and points of view of League members in the four States, the Lake Michigan Inter-League Group wishes to express the following recommendations to the conference:

1. That a uniform plan for enforcement of interstate water quality standards be established, which

necessarily involves:

a) coordination of standards among the four States involved, particularly as they pertain to streams draining into Lake Michigan,

b) uniform enforcement procedures,

c) Federal surveillance and testing of water with regular reports to the Federal Water Pollution Control Agency and the States,

2. That the Federal Government and the States look at Lake Michigan as an entity, whether the focus be on problems of pollution, supply, or use.

3. That a timetable be established which provides for consistent, planned advances in pollution abatement.

4. That enforcement of the timetable and standards be strict, and action upon the recalcitrant polluter

speedy.

5. That coordinated research programs among States be encouraged to facilitate feasible, economical solutions and prevent duplication of effort and expense.

These recommendations are based upon results of a study currently underway by State and local Leagues in the four States. While the conference will, we hope, want to read the detailed statements submitted by each of these four State Leagues, I would like to quote briefly from them so that you gentlemen will understand the depth and scope of League concern for Lake Michigan.

The League of Women Voters of Indiana in commenting on the Jones Subcommittee Hearing held in Chicago in 1963 says, "in the four years since we made our statement to the Jones Committee, conditions in Lake Michigan have not improved, not even remained as they were then, in fact have become much worse." Later in the Indiana statement, in commenting on efforts since that time, they say, "Indiana's schedule for compliance on industrial criteria in the Lake Michigan area proved to be a year and a half later than the one agreed upon by the conferees of the 1965 two-state conference. Also, Indiana reports that three of the industries of this area have not agreed to abide by Indiana's schedule."

The League of Women Voters of Illinois points up need for a look at the total picture by saying, "The elusive sources of this increased pollution, in spite of a two-year effort to abate it in the southern end of the lake, call for the wider study of the entire lake." ... "We find that lack of information on the true sources of pollution entering our sector of Lake Michigan sometimes leads to public unwillingness to tackle local problems."

The League of Women Voters of Michigan has completed its section of the study and copies of their findings are attached to their statement. At one point they say, "The League of Women Voters of Michigan is concerned about the lack of coordination of agencies involved in the Lake

Michigan Basin . . . there are five U. S. Coast Guard stations in Michigan which are discharging raw sewage into the Lake . . . two facilities of the Corps of Engineers and. . . a National fish and wildlife station discharging wastes into Lake Michigan."

The statement of the League of Women Voters of Wisconsin includes these sentences: "We still have some municipalities without sewage treatment plants, some without secondary treatment, many with combined sanitary storm sewers, and, of course, thousands of septic tanks operating at less than top efficiency. . . Now we are seeing the results of our carelessness in the destruction of the shoreline and pollution of the waters of Lake Michigan."

It would seem that these statements also point up the finding that no State is blameless as a contributor to pollution of Lake Michigan. No State, however, is apathetic or unconcerned, either. As League members, as citizens of the Lake Michigan Basin, we believe the time for pointing an accusatory finger at any one State, industry, or local community is past. What is needed is a sincere, earnest, forthright attempt to assess where we are now in controlling the quality of the lake, what things we can do better in this four-State area by working together on the State level, what kind of Federal assistance can be most effective in helping us to achieve cleaner water in Lake Michigan.

In working to accomplish this objective, the League of Women Voters is prepared to accept responsibility for helping citizens to understand their necessary role--be it via State or local legislation involving bond issues, increased taxation, more strict monitoring and enforcement procedures. The League is also uniquely equipped to influence public opinion and public support for the climate of opinion and spirit of unity and cooperation which must exist among governments and citizens in these four States.

Because we are a National organization--which operates on State, local and on water matters, a basin level--it is possible for us to try to evaluate the problems and proposed solutions for Lake Michigan without undue concern for arbitrary governmental boundaries and administrative restrictions. We are eager to be of whatever assistance we can to both Federal and State conferees in implementing decisions and/or recommendations of this conference. In itself, this conference will not clean up Lake Michigan, but we hope it will point the way to preservation and wise use of this vital asset. Thank you for the opportunity to present our views.

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League of Women Voters of Indiana
506 Illinois Building
17 West Market
Indianapolis, Indiana 46204
January 1968

STATEMENT TO THE FEDERAL-STATE
ENFORCEMENT CONFERENCE ON POLLUTION
IN LAKE MICHIGAN AND ITS TRIBUTARY BASIN
BY THE LEAGUE OF WOMEN VOTERS OF INDIANA
CHICAGO, ILLINOIS - JANUARY 31, 1968

In the opinion of the League of Women Voters of Indiana, the most important thing to realize, is that time has run out for Lake

Michigan. There is no future time left. Improvements must begin now and continue at an accelerated pace. The damage to Lake Michigan that has occurred to date will take a great many years to reverse. We need not add to the description of poor conditions that is being presented to this conference. We do believe that, since the four States on Lake Michigan participating in this current conference create the entire boundaries of the lake which is entirely contained within the United States, it is possible to develop the kind of control of lake conditions that would allow Lake Michigan to have the top water quality in the Great Lakes.

At a hearing held in Chicago, Illinois, September 6, 1963, by the Subcommittee on Government Operations of the House of Representatives, chaired by Mr. Jones, the League of Women Voters of Indiana filed a written statement relating to conditions on Lake Michigan. Since that date there has been an enforcement conference with follow-up meetings for Indiana and Illinois. Considerable public interest and discussion have taken place also. We know that the Indiana-Illinois conference was productive of regulations and criteria for water. It is to be expected that the 1965 Indiana-Illinois conference will produce some results by the end of 1968. But will they be enough?

In the four years, plus, since we made our statement to the Jones committee, the conditions in Lake Michigan have not improved, not even remained as they were then, in fact have become much worse.

The Indiana League of Women Voters hopes that this 1968 four-State conference can produce an agreement that will greatly accelerate the action so vitally needed.

We were advised by a letter, written on November 17, 1967, by Mr. Blucher Poole, Technical Secretary of the Indiana Stream and Pollution and Control Board, that the Secretary of the Interior has approved Indiana State water quality criteria and plan of implementation. Yet in these water quality standards, as approved, Indiana schedule for compliance on industrial criteria in the Lake Michigan area proved to be a year and one half later than the one agreed upon by the conferees of the 1965 two-State conference.

Indiana news reports have said that Indiana standards are more strict than the ones agreed upon at the 1965 conference. Some industries have stated that they could meet the 1965 conference standards but not Indiana stricter standards until 1970. These reports point up the need for a uniform set of standards and time schedule. Also, Indiana reports that three of the industries of this area have not agreed to abide by Indiana schedule.

Among the many things that this conference could consider are the problems of eutrophication. What can be done about encouraging the kind of municipal treatment facilities that can remove phosphates or separate storm sewers? Some Indiana municipalities are reported as having inadequate or overloaded treatment plants. The Army Corps of Engineers needs permanent, not a temporary, arrangement for dumping canal dredgings, other than in Lake Michigan. Is it not time to consider the manner of caring for the water that will be used by the planned nuclear power plants? What can be done about landfills? Is the Army Corps of Engineers, whose interest is centered on navigation, to remain the only body concerned in permitting landfill? This present practice seems strange, if our modern day population and industrial needs are considered in regard to the vast water use of Lake Michigan.

The peculiar water currents in the lake should be given utmost consideration. The new report made by the Federal Water Pollution Control Board on lake currents could prove helpful. How do seasonal change,wind direction, or other phenomena affect the amounts of accumulated polluted material? Currents should be fully understood in regard to these effects before allowing shore or island fills.

We wish to express our commendation of joint action and cooperation between the four States and our hopes for beneficial results from this enforcement conference.

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LEAGUE OF WOMEN VOTERS OF ILLINOIS

League of Women Voters of Illinois
67 East Madison Street
Chicago 60603
January 31, 1968

STATEMENT TO THE FEDERAL-STATE ENFORCEMENT CONFERENCE ON POLLUTION IN LAKE MICHIGAN AND ITS TRIBUTARY BASIN

BY THE LEAGUE OF WOMEN VOTERS OF ILLINOIS

The League of Women Voters of Illinois supports the concept of regional planning for Lake Michigan and its tributary basin. We believe that all Federal, State and local agencies in the area must plan coöperatively for the orderly development and protection of this vast public water resource. We applaud the convening of this four-State conference and appreciate the opportunity to present our views.

There is graphic evidence of the deterioration of water quality in Lake Michigan. The Calumet Area Post Action Surveillance Project, Department of the Interior, submitted a report to the Illinois-Indiana Conference in September 1967. That report indicated that water quality at the City of Chicago public water intake cribs did not meet the criteria established by that conference in early 1966. In many instances, contaminants exceeded those reported by the Chicago Department of Water and Sewers in March 1965. This department reported on September 11, 1967, that there had been a steady decline in open water quality of Lake Michigan since the report of March 1965. This lowered quality affected the water intake at both the Central Filtration Plant and the South District Filtration Plant, whereas the report of March 1965 had shown only occasional pollution at the Central Filtration Plant. The elusiveness of the sources of this increased pollution, in spite of a two-year effort to abate it in the southern end of the lake, calls for a wider study of the entire lake.

The League of Women Voters believes that an ongoing four-State conference is essential to coordinate the implementation and enforcement of water quality standards for Illinois, Indiana, Wisconsin and Michigan, as soon as the standards have been approved by the Secretary of the

Interior. We urge the conference to establish a surveillance team which will make regular reports to the conferees on the progress of pollution abatement in the lake basin. Such a surveillance team can pinpoint sources of pollution and bring more prompt compliance with standards. The publication of surveillance reports when published will serve to win public support for abatement measures.

We urge the conferees to establish routine methods for uniformly upgarding each State's water quality standards relating to Lake Michigan and its tributary rivers as water quality improves. The conferees will want to assess the damage to lake waters from chemical fertilizers and pesticides and adjust standards to eliminate the danger of pollution from these sources. With the anticipated construction of nuclear power plants using Lake Michigan water at a number of locations on her shores, we suggest the study of the effects of thermal pollution and radio activity with subsequent adoption of suitable criteria for these facilities. As the many research projects now underway identify other sources of pollution and develop the technology to cope with them, the conferees will wish to make recommendations for new measures to control these sources of danger.

We would further urge a study of uniform laws for both private and commercial vessels using Lake Michigan and its tributary waters. Such laws should control pollution from all sanitary and oil discharges from both types of vessels.

We urge the conference to resolve the apparent inconsistency in having June 1970 remain--in the Indiana standards approved by the Secretary of the Interior--as the compliance date for specific industries now under a December 1968 compliance order by action of the 1967 Illinois-Indiana Enforcement Conference. We would expect adherence to the original date.

The League of Women Voters of Illinois recognizes that some of the Lake Michigan pollution originates in our own State and has supported all Illinois legislation aimed at reducing it. In the Illinois Legislature, we testified in support of the passage of the

LEAGUE OF WOMEN VOTERS OF ILLINOIS

$1 billion Resource Development Bond Act and will work for its passage in November 1968. Since funds from this Bond Act will not be available before 1969, we have also supported an immediate appropriation for State funds to match Federal grants for construction of sewage treatment plants under Public Law 660. This latter legislation was vetoed. We have supported legislation to prohibit the dumping of dredgings in Lake Michigan, and are gratified to know that such legislation will become effective this year. Inasmuch as this anti-dumping measure affects only the Illinois portion of Lake Michigan, we urge the conferees to consider measures to protect all other parts of the lake as well from the dumping of polluted dredgings.

Local Leagues in Illinois are studying the problems created by sewage disposal plants and local industries which contribute to the pollution of Lake Michigan. We are aware that the North Shore Sanitary District in Lake County, Illinois faces major costly problems in plant improvement to reduce the pollution now discharged into the lake from its primary treatment facilities. We can no longer afford the luxury of indifference and will work realistically to eliminate this pollution. Our other major source of Lake Michigan pollution from Illinois is the Calumet River area where combined storm overflow and industrial wastes must be eliminated. We shall support compliance with water quality standards for municipal and industrial polluters as determined and enforced by the Illinois State Sanitary Water Board.

We find that lack of information on the true sources of pollution entering our sector of Lake Michigan sometimes leads to public unwillingness to tackle local problems. We feel that this four-State conference can eliminate misinformation and increase popular support for all Federal, State and local measures essential to the protection of Lake Michigan.

In summary, we request the conference to consider:

1. Basinwide surveillance with reporting.
2. Four-State, unified action to upgrade standards as needed.

3. Broadening of standards to include criteria not now included, as research establishes these criteria.
4. Uniform shipping and boating regulations.
5. Uniform dumping measures.
6. Continued public hearings.
7. Strict enforcement with prompt reporting of non-compliance.

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League of Women Voters of Michigan
4612 Woodward Avenue, Room 317
Detroit, Michigan 48201 - TE 3-7133
January 31, 1968

STATEMENT FILED WITH THE FEDERAL CONFERENCE ON POLLUTION OF LAKE MICHIGAN AND ITS TRIBUTARY BASIN BY MRS. ROBERT ZILLY, WATER RESOURCES CHAIRMAN LEAGUE OF WOMEN VOTERS OF MICHIGAN

FEBRUARY 5, 1968

The preservation of clean waters in the Lake Michigan Basin is of prime importance to the State of Michigan because of its unique geographical location, its many miles of beaches, and its myriad streams and inland lakes offering recreational outlets to an increasing population centered around the southern end of Lake Michigan. A sizeable resort and tourist industry exists in western Michigan and is dependent upon the maintenance of waters suitable for swimming and streams capable of supporting fish and wildlife.

A population increasing in geometric proportions in Michigan will be dependent upon waters that are safe for drinking without the addition of huge quantities of chlorination. Expanding industrialization and the development of extensive power generation plants, both nuclear and steam, in the basin are dependent upon water quality and the State water resources. For these reasons, the League of Women Voters of Michigan urges the strict enforcement of the highest water quality standards possible for Lake Michigan.

We would like to take this opportunity to commend the Michigan Water Resources Commission and the Department of Conservation for its efforts to set adequate water quality standards, develop studies of present and future water resources and uses, and use designations for the tributaries of the Lake Michigan Basin which reflect full consideration of the varied uses of Michigan waters. The following concerns voiced by the League of Women Voters of Michigan are made, not in criticism of any agency, but as a recognition of the rapidly deteriorating quality of the waters of Lake Michigan and its tributaries.

Our first concern is the proposed Michigan water quality standards per se. The wording in the summaries of programs to control and abate pollution seem to present loopholes for enforcement and are subject to varied interpretations. The use of such terms as "when feasible," "the best practical treatment or control," "such technology and processes which are known" and the interpretation of the word, "injurious," offer escape clauses in a strict enforcement program. The League of Women Voters of Michigan is concerned, also, about Federal acceptance of the water quality standards for Michigan. We appreciate the time taken for careful evaluation before Federal approval, but we do hope that acceptance of Michigan standards will be expedited. Finally, the strict enforcement of the highest possible water quality standards concerns the League of Women Voters of Michigan. The pressures for lowering of some standards have been many and varied. If the four-State conference can establish uniformly high water quality requirements in the basin, these pressures may be alleviated.

Secondly, the League of Women Voters of Michigan is concerned about the lack of coordination of agencies involved in the Lake Michigan Basin. While the Federal Water Pollution Control Administration actively works for pollution abatement, there are five U. S. Coast Guard stations in Michigan which are discharging raw sewage of human origin directly into Lake Michigan and two facilities of the Army Corps of Engineers which are contributing waste waters to Lake Michigan.

Besides the need for coordination between agencies, it seems necessary to

LEAGUE OF WOMEN VOTERS OF MICHIGAN

coordinate water quality standards between the four States in the basin. Pollution from one State streams into Lake Michigan inevitably affects water intakes and uses in other States.

If one State sets low standards or does not enforce its standards, it is difficult to enforce high water quality standards in another State. It would be logical for the four States to coordinate their water quality standards, plans for implementation and enforcement procedures in any realistic attempt to abate pollution in Lake Michigan.

Pollution of Lake Michigan by Michigan industries and municipalities does not compare proportionately to pollution from other sections of the basin where there is heavy industry. However, the League of Women Voters of Michigan is concerned about the wastes discharged in the lake from Michigan plants as established by the Michigan Water Resources Commission. We hope a strict enforcement program with specific timetables for each municipality and industry now discharging wastes into the lake or its tributaries will be realized by the Commission.

Filamentous algae in the St. Joseph River, algae blooms in the Traverse Bay area, and nuisance accumulations of algae at the mouth of the Grand River are evidence of the need for such a program.

Finally, the League of Women Voters of Michigan is particularly concerned about the effect of thermal pollution on Lake Michigan. A nuclear power generating plant is in the process of being built at South Haven which will use an estimated 743 million gallons per day for cooling water to be returned to the lake. A proposed plant forty miles south of South Havén at Bridgman will be an ever larger user of Lake Michigan waters for cooling. The accumulated effect of these discharges into a lake which has a very low rate of exchange presents a disturbing problem.

It seems to us that here is an opportunity to apply preventive measures as opposed to waiting for 20 years under existing standards and then try to remedy a problem. The State of Michigan has established a new use ordinance which requires an industry to present a statement to the Michigan Water Resources Commission setting forth the nature of the development which requires a new use or increase over the present use, the amount of water to be used, its source, its point of discharge, the estimated amount, and the expected characteristics of the water. However, the language as now written seems to apply to waste disposal or sewage.

Whether these terms will be interpreted in a court case to include cooling waters is not clear. It is our understanding that proposals for nuclear energy plants in the other three States would also use Lake Michigan waters for cooling. Given the nature of currents in the southern half of Lake Michigan, a giant whirlpool of very warm water at the southern tip of the lake is within the realm of possibility. This is in the same area of the densest population and the greatest number of industries now discharging wastes into the lake. The prospect offers an opportunity for creative planning on the part of the Federal and State agencies involved. The League of Women Voters of Michigan hopes this conference grasps this opportunity rather than waiting to find costly remedial measures necessary.

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League of Women Voters of Michigan
4612 Woodward Avenue, Room 317
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Price: 30¢
January, 1968

LAKE MICHIGAN BASIN STUDY: MICHIGAN SECTION

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CHARACTERISTICS

Lake Michigan is the sixth largest fresh water lake on earth, with an area of 22,400 square miles and a volume of 1,116 cubic miles. The lake surface elevation averages about 580 feet above sea level, common with Lake Huron. It is divided into two deep-water basins by a submerged ridge running roughly from Grand Haven to Milwaukee. The average depth of the ridge is approximately 232 feet. The maximum depth of the lake, 923 feet, is in the northern basin. The land drainage area is 45,460 square miles, 64% of which is in Michigan. The lake surface accounts for over 31% of the total drainage area. Discharge of Lake Michigan occurs through the broad, deep straits of Mackinac (no measurable gradient) into Lake Huron, and by diversion through the Chicago Sanitary & Ship Canal and into the Mississippi River system. The latter discharge is approximately 3,100 to 3,200 cubic feet a second (cfs) and combines direct diversion and domestic pumpage. The normal outward flow into Lake Huron has not been precisely determined. It is estimated to be between approximately 40,000 and 55,000 cfs.

Lake Michigan occupies a great valley in the Paleozoic sedimentary rocks which lap onto the southern edge of the Pre-Cambrian Canadian Shield. This valley originated in pre-glacial times and in rock least resistant to erosion. Jack L. Hough in his Geology of the Great Lakes (1958) suggests that the existence and orientation of this feature exerted a strong influence on subsequent glacial ice movement which was responsible for the final shaping of the Lake Michigan basin. The existing Great Lakes are of comparatively recent origin, the present levels having been reached only about 2,500 years ago.

The coastline of Lake Michigan, with the exception of Green Bay, Little Traverse Bay and Grand Traverse Bay is quite regular. Lake Michigan is characterized by few natural good harbors; however, the outlets of drowned estuary lakes in the mouths of several Michigan rivers have been improved and protected to provide excellent facilities.

Some of the Nation's finest beaches are found along the east coast of Lake Michigan. The 1,058 miles of Michigan shoreline are comprised of relatively limited areas of sedimentary rock outcrops and shingle beaches; some areas of till and clay bluff, and many hundreds of miles of sand. Sands are either piled high in the great dunes or low and undulating in the beach ridges. Sands that slope gradually into deeper waters, provide an excellent swimming facility.

HYDROLOGY

Knowledge of the hydrology of Lake Michigan is essential for the solution of most practical problems pertaining to this body of water. The United States Lake Survey has recorded water levels for over 100 years, and has made detailed surveys of the bottom topography. The Great Lakes Research Institute began a continuing program of fundamental investigations in 1954.

Lake Currents

Surface currents are produced mainly by wind action and differences in barometric pressure over different parts of the lake. Brief windstorms may create surface waves which cause strong local currents of short duration. Strong winds of longer duration will produce a transfer of water toward the leeward shore and a temporary circulation which is affected by the shape and topography of the lake basin. Such water movements are of a temporary nature. In addition, there appears to be patterns of permanent, or at least seasonal, circulation involving a slow drift of the water.

There is a southward drift along the western side of the lake which continues around the south end and turns northward on the eastern side, where it becomes more pronounced. Around the Beaver Island group in the north and in the major southern basin there are counter-clock-wise swirls. Between these swirls the surface water tends to move eastward along lines which are curved with their convex sides to the south.

The prevailing westerly winds, coupled with the flow toward the outlet, are considered the cause of the above flow patterns. Some authorities dispute the counter-clock-wise swirls described above. Northeasterly winds can alter normal flow patterns. At times the flow through the Straits of Mackinac is temporarily reversed.

Lake Levels

The principal natural factors which affect the longer-period fluctuations of the level of Lake Michigan are precipitation and evaporation. Precipitation falling directly on the lake surface raises the surface immediately. Precipitation falling on the land surface of the drainage area has a delayed and variable effect. Average annual precipitation varies from about 28 inches on the northern part of the lake to about 32 inches on the southern part. Evaporation from the lake surface has been estimated as being approximately equal to precipitation upon it.

The levels of Lakes Michigan and Huron for 105 years (1860-1965) have ranged between 583.68 feet (1886) and 577.09 feet (1964), a range of 6.59 feet. The highest modern level occurred in 1952, 582.69 feet. The levels of Lakes Michigan and Huron is affected by the diversion at Chicago of 3,100 cfs (withdrawal) and the diversion into Lake Superior of 5,000 cfs via the Long Lake and Ogoli projects. The net effect of both diversions is to raise the levels of Lakes Michigan and Huron about 0.14 foot above what it would be without withdrawals and additions.

Levels follow a seasonal pattern with highs generally occurring in summer and lows in winter or early spring. Within a year, variations average about 1.1 feet.

Water Quality

The chemical and biological characteristics of Lake Michigan waters are not uniform. They vary from north to south and from the deep central part of the lake to the shallow shore zones.

The natural waters of Lake Michigan are moderate in hardness, and very low in turbidity and chlorides. The over-all chemical quality shows little change from year to year. Tributary runoff influences the quality of the onshore lake waters in the vicinity of the tributary outlets increasing in some instances the coliform counts at other points of water use.

Tributary Streams in Michigan

Pine River; Boardman River; Manistee River; Pere Marquette River; Pentwater River; White River; Muskegon River; Grand River; Black River, Holland; Kalamazoo River; Black River, South Haven; St. Joseph River; Menominee River; and Manistique River.

Aquatic Life

The bottom sediments of Lake Michigan along the shoreline of Michigan are of two major types; cobbles and boulders or sand. In addition, these two types may be mixed with or overlain by organic and inorganic solids carried to the lake by the rivers. In the rocky areas the predominant organisms are longnosed dace, sculpins, crayfish, stoneflies, mayflies, caddisflies, midges, and scuds. In the areas of clean, sand bottom the most commonly found organisms are scuds, aquatic worms, midges, and fingernail clams. In the area affected by the deposition of organic sediments carried in by rivers the predominant organisms may be the tolerant aquatic earthworms. Water quality along our Michigan shoreline is very good and exceeds that necessary to guarantee the growth and propagation of the aquatic life found in these areas. Green filamentous algae grow in the rivers draining into Lake Michigan. In certain areas of the lake further growth takes place in Lake Michigan itself.

POPULATION

There were more than 2,500,000 people in the Michigan portion of the Lake Michigan basin in 1960. The population varied from the densely settled metropolitan areas of Grand Rapids and Lansing to the virtually uninhabited State and Federal forest in the Upper Peninsula. The area can be divided into the three traditional zones of Michigan: the relatively densely settled and intensely developed southern Lower Peninsula had 26% of the land area and 83% of the 1960 population, while the moderately populated northern Lower Peninsula had 21% of the land and 11% of the population, and the sparsely settled Upper Peninsula had 17% of the land and only 6% of the 1960 population. The 1960 population densities were below 17 people per square mile for the Upper Peninsula, nearly 27 people per square mile for the northern Lower Peninsula, and over 150 people per square mile for the southern Lower Peninsula. Based upon past history, the population will be approximately 2,800,000 in this area in 1980, with the bulk of this increase in the southern Lower Peninsula.

ECONOMY

The Lake Michigan Basin of Michigan is divided into three areas as given below:

Western Michigan Lake Shoreline

1960 Population	976,000 change 1950-1960 24%
Land Area	6,662 square miles

The early economy was largely timber oriented. As the great timber resources were cut, the logs were floated to the sawmills, located at the mouth of all principal rivers. Around these mills, and the docking facilities required to transport the sawn timber, there developed many of the cities of western Michigan...Muskegon, Grand Haven, Manistee, Ludington, Traverse City. With the end of the timber harvest, the sawmill towns were able to convert their economies to a general manufacturing and wholesale and retail trade base. This transition was made possible in a large measure by the existing lake port transportation facilities. There are two metropolitan areas in the area, Grand Rapids and Muskegon. Grand Rapids made a rather natural transition in its economy, from sawmills to furniture to a modern industrial city, manufacturing a wide range of fabricated metal products, automobile parts, machinery, etc. Muskegon, once one of the world's leading producers of lumber, has become a manufacturing center of engines, automobile parts, foundry products, etc. The smaller cities of the area are also manufacturing oriented. Food processing, canning and marketing are a significant segment of the economy. Western Michigan is one of the nation's leading fruit and vegetable growing regions. This is made possible by the climatic influence of Lake Michigan. Apples, cherries, peaches and pears are the leading tree fruits. Truck farming and small fruit producing are also major agricultural enterprises. The entire west coast of Michigan is used intensively for recreation. Tourism and summer residences furnish a substantial income to non-agricultural workers in rural areas.

Upper Peninsula - Eastern Area

1960 Population	128,521 change 1950-1960 3.6%
Land area	7,832 square miles

The general unsuitability of much of the area to agriculture (both climate and soils), the lack of mineral wealth, and its remoteness to population centers are reflected by the sparse population of the eastern Upper Peninsula. Nearly a third of the population is centered in the cities of Escanaba, Menominee and Sault Ste. Marie. All three are important ports on the Great Lakes. The past economy of the area was natural resource oriented (timber, fish, recreation). The current economy is based on wood-using industries (pulp, paper, wood products), light manufacturing and recreational facilities, resorts and summer homes. Although farming has declined in general, that remaining is more efficient and more profitable.

Lower Peninsula - Northwestern Area

1960 Population	141,019 change 1950-1960, 2.6%
Land area	6,147 square miles

The economic history of this area was once timber, the northern Lower Peninsula of Michigan together with areas in other states bordering the Great Lakes was the site of the world's greatest white and red pine forest. This vast region was logged off in the last four decades of the 19th Century. During the logging, and for a considerable period afterwords, the most extensive forest fires in this Nation's history ravaged these pine lands, often burning over the same area several times. Not only were the few remaining trees destroyed, but of even more significance was the destruction of the soil. The meager humus and organic matter on the northern sandy soils were consumed. For over a generation the burned lands remained bare and stark. Gradually the burns were re-forested, but not with the original species. The great pine stands were replaced by aspen, oak, pin cherry and jack pine. So great an amount of land was re-forested by these rapid growing hearty species that they became a valuable resource. Once again wood products utilization is an important aspect of the economy. The great wooded stretches are gaining in economic importance with recent development of an expanding wood using industry (particle board, pulp and paper). Farming is an important part of the economy, providing employment for nearly one-third of the population. The trade, services, construction and employment by the recreation industry is increasing yearly.

Agriculture

Of the 48 counties which lie wholly or partially in the Lake Michigan basin, all of which have Soil Conservation Districts formed, dairying is the most important type of agricultural activity in 25 of them. Field crop production is the most important in 13 of the counties, fruit production in eight of the counties and poultry production and livestock production in one of the counties each.

Agricultural Irrigation

The use of Lake Michigan waters for agricultural irrigation is of little significance in the total water use picture. Less than 400 acres are presently known to depend upon Lake Michigan as a source of irrigation water. The greatest amount of this irrigated acreage, approximately 300 acres, is located in Leelanau and Grand Traverse Counties.

Land Use

The land use of the Lake Michigan basin ranges from the intensive use of the metropolitan areas of the southern Lower Peninsula to the extensive use of the forests in the northern Lower Peninsula and the Upper Peninsula. The dominant land use in the southern Lower Peninsula is farmland, with over 80% of some counties devoted to agricultural use. The percentage of forest land, ranges from below 9% in Clinton County in the southern Lower Peninsula to over 90% in Roscommon County in the northern Lower Peninsula and in several counties in the Upper Peninsula. The value and use of the land is reflected in the fact that the percentage of publicly-owned land ranges from a low of 0.01% for Van Buren County in the southern Lower Peninsula to a high of nearly 61% for Schoolcraft County in the Upper Peninsula.

(All data in this report and whatever maps accompany it are used with the permission of the Water Resources Commission, Michigan Department of Conservation.)

EXISTING PROBLEMS

BEACH EROSION

Certain waters along the shoreline of Lake Michigan show the effects of man's activities in the use of the land and the water resources. Conditions of these waters reflect soil erosion, land runoff, municipal and industrial waste water effluents and tributary flows.

The coastline of Lake Michigan has severe problems of beach erosion. Damage occurs primarily during periods of high lake levels, as was experienced during the early 1950's. Wave action on clay and sandy bluffs causes slides which not only damage lakefront property on the bluff, but come to rest in the lake to reduce its recreational value.

BIOLOGICAL PROBLEMS

Algae and slimes are produced in significant amounts in the lower 1 1/2 miles of the Boardman River which discharges into the west arm of Grand Traverse Bay. These growths slough and are carried in suspension to the bay where they accumulate off the river mouth and may be deposited along adjacent beaches, depending on wind and current conditions. Higher aquatic plants and filamentous algae are produced on the shallow shelf of the southeast corner of the bay. The Michigan Water Resources Commission is of the opinion that the waters of the Boardman River, enriched by the discharge of municipal waste water treatment plant and several cherry processors, cause the development of these growths. Plans are now being prepared to improve the water quality problems of this area.

The effects of wastes from groundwood and paper mill on benthic fauna in the Little Bay de Noc area was studied in 1963. Some areas had a woody, paper odor. Some areas produced gas, had a noticeable surface fibre layer, and a sour odor of decomposing wood.

Approximately 60 miles of Lake Michigan shoreline from South Haven to Pentwater had noticeable accumulations of cladophor during August, 1966. In a 30-mile area around Muskegon, park managers received complaints that algae stained bathing suits and conditions were unsuitable for swimming. The Grand River, Muskegon River, and White River dishcarge into this section of Lake Michigan and the Water Resources Commission relates this to agricultural and urban areas of midwestern Michigan.

ALEWIVES

Alewives have become a major problem on the beaches of Lake Michigan. Mortality of alewives is high enough to cause windrows of dead carcases on the beaches which create an odor nuisance, are of concern to the Department of Public Health, and greatly affected the resort area in the summer of 1967.

COMMERCIAL NAVIGATION

The number of incidents of oil pollution from commercial navigation vessels has increased in recent years. These incidents correspond to the increasing use of oil as a fuel. An attendant problem is the indiscriminate overboard disposal of garbage and trash.

THE WATER USE AND CONTROL PROGRAMS IN THIS BASIN

WATER SUPPLY

Principal sources of local water supplies (covering municipalities of 10,000 population or more in State of Michigan within the drainage basin of Lake Michigan) include:

23 municipalities (1960 population of 650,000) using Lake Michigan as raw water supply withdrawing over 90 million gallons a day in 1966.

Of these 23 municipalities the following are over 10,000:

St. Joseph
Benton Harbor
Holland
Wyoming
Grand Rapids
Muskegon Heights

Muskegon
Ludington
Traverse City
Escanaba
Menominee
Grand Haven

In six locations water is withdrawn directly from Lake Michigan for power generation.

In addition the following cities over 10,000 are within the Lake Michigan drainage basin:

Battle Creek
Kalamazoo
Jackson - wells

Lansing - wells
East Lansing - wells
Cadillac

Principal Sources of Water Supply in Basin:

In the Upper Peninsula many small lakes and seven rivers drain southward into Lake Michigan.

In the Lower Peninsula roughly one-half of the state divided by a north-south line nearly in the center of the state comprises the basin which drains into Lake Michigan. There are hundreds of lakes in this basin, ranging from small ponds to Houghton Lake, which is 16 miles long and 7 miles wide and is the source of the longest river in the Lower Peninsula, the Muskegon. The next longest river is the Grand, and there are seven other rivers which empty into Lake Michigan from the Indiana border to the Straits of Mackinac.

In addition there are so many artificial lakes, ponds, and reservoirs that some experts believe the artificial surface water may soon be competitive with the natural surface water. In the early development of Michigan several hundred sites were found on streams for the production of electricity. Most of these plants have been abandoned, but the dammed up waters still serve recreational purposes. Around a hundred reservoirs are still marked on the map in this Lake Michigan basin, and there are six municipal and industrial water supply reservoirs.

Water supply for present population & industry:

The supply is sufficient in most areas most of the year, though in times of drought municipalities have found it necessary to restrict the use of municipal water supply for lawn sprinkling, car washing, etc. There is a tendency for cities to shift from ground to surface water as this is a source of more unlimited supply.

Ground water is being depleted faster than it is being replenished:

This is most evident in some areas of high population density. The ground water level is being lowered each year. In the East Lansing-Lansing area, for example, the Red Cedar River has become almost an intermittent stream.

Anticipated demands will intensify the problem as population is estimated to increase by 550,000 in this portion of Michigan by 1970 and industry will increase proportionately. Electric generating plants, in particular the nuclear variety, will be demanding increased supplies of cooling water.

Plans for expansion of water supply systems include a feasibility study now being made of a proposed 215 mile pipeline from Grand Haven on Lake Michigan through Jackson, Battle Creek, Kalamazoo, Lansing, and South Haven.

Agencies

State agencies having a responsibility in connection with water supplies in the Lake Michigan basin include:

- Department of Public Works
- Department of Commerce
- Water Resources Commission
- Department of Health
- Other

Federal agencies include:

- U. S. Geological Survey
- Army Corps of Engineers
- Soil Conservation Service
- Public Health Service
- Other

As an example, the following federal and state agencies were involved in the Grand River Basin Study:

Federal

Department of Agriculture
" " Commerce
" " Health, Education & Welfare
" " Interior
Federal Power Commission
U. S. Army Corps of Engineers

State of Michigan

Department of Agriculture
" " Conservation (Geological Survey)
" " Economic Expansion
" " Health
" " Highways
Soil Conservation Commission
Waterways Commission
Water Resources Commission (Department of Conservation)
Office of Attorney General

POLLUTION ABATEMENT

The Michigan Water Resources Commission states that the overall chemical quality of Lake Michigan shows little change from year to year but that the tributary runoff influences the quality of the on shore lake waters in some instances increasing the coliform count at other points of water use. But, at the organizational meeting of this group, William Kerr of the Federal Water Pollution Control Administration (F.W.P.C.A.) warned that Lake Michigan was accumulating 3/4 parts per million of persistent chemical salts per year. Pollution determination seems to depend on a definition of what constitutes pollution. According to chemist Robert Rainey of Oak Ridge National Laboratory, the natural flow of water through Lake Michigan is so slight that it would take 100 years to purify 90% of its polluting wastes if pollution were to cease tomorrow.

The pollutants which cause a lake to age are the phosphates and nitrates in municipal waste water even after it has had secondary treatment. Many industries in Michigan are also phosphate and nitrate-producing such as pulp and paper industries located in Kalamazoo, Muskegon, Escanaba, as well as other areas: the fruit-canning industries, notably in Traverse City; the tanneries, an example of which may be found in Grand Haven; and other types of industries. Also contributing to organic wastes are the large and small craft, many of which contain no facilities for sanitary disposal of sewage and garbage. Large quantities of oil often reach Lake Michigan, directly or indirectly from ships, industries, or gas stations which may dispose of oil by emptying it into storm sewers.

Some tributary rivers of Michigan that empty into Lake Michigan pollute the on shore waters of the lake. H. C. Grounds, Chief of Engineering of the F.W.P.C.A., lists the Grand, Menominee, St. Joseph, and the Kalamazoo Rivers as badly polluted. The Michigan Water Resources Commission monitors the water quality of 11 tributary rivers at 12 monitoring stations as they flow into Lake Michigan. Using coliform count, biochemical oxygen demand, and chemical oxygen demand compared with dissolved oxygen present as criteria from these records; it appears that ten of these tributaries are polluted but the severity of the pollution varies. Muskegon and Manistee Lakes are flushed into Lake Michigan by powerful rivers. These lakes are polluted by organic wastes, salts, oilslicks and garbage from ferrying operations. The Boardman River is polluted in the Traverse City area from municipal and industrial wastes. The Pere Marquette River is polluted in the Ludington area by sewage and industrial wastes. The White River is polluted in the Whitehall and Montague primarily by industrial wastes. The four rivers listed as badly polluted carry the treated wastes of cities and the untreated wastes of villages, silt, organic and inorganic wastes from industry, fertilizer, and pesticides.

The Pere Marquette is a trout stream, but it is polluted in the Ludington area where the city pours about ten tons of solid sewage into Pere Marquette Lake each month from its outmoded sewage plant built in 1936. Storm and sanitary sewers are combined which creates an overflow in the sewage plant during storm water conditions. There is also a chemical company located near Ludington which is filling a marsh near the mouth of the river with wastes. Brine is pumped by pipeline 5,000 feet down into the depths of Lake Michigan where it is there to stay. The Water Resources Commission allows the company to dispose of its wastes in this manner.

Dredging operations carried out by the United States Army Corps of Engineers are a source of pollution. At the present time, the dredgings are carried out of river channels and estuaries and dumped into Lake Michigan. The Corps has agreed to remedy this situation within three years.

The Pine, Au Sable, Platte, and Betsy Rivers are desirable trout streams, but they are sometimes polluted by septic tank seepage or other sanitary arrangements of the cottages which border these streams.

At one time all of the rivers in Michigan were trout streams. With the anadromous fish program now being carried on by the Fish Division of the Michigan Department of Conservation, all of the streams again have the potential for unlimited recreational opportunities, if pollution can be abated.

Some rivers in Michigan have been developed for trout fishing and therefore, are reasonably clean in most areas. Management projects to prevent silting financed by the Dingell-Johnson fund which is supported by a 10% federal tax on fishing tackle, are carried out on the White River, the Big Manistee, the Little Manistee, the Platte, and the Pine Rivers. Stabilizing stream banks with stumps, rocks, or seeding aids in the high quality of trout stream waters.

The Black River has improved in recent years due to the work of the Water Resources Commission to the extent that fish may again be caught. The water quality standards for the St. Joseph River, set by the Water Resources Commission, have been the subject for much disapproval and debate by the Michigan United Conservation Clubs. M.U.C.C. contends that the standards are not high enough for the support of fish life.

Two lakes which are continually flushed out into Lake Michigan by powerful streams are Muskegon Lake and Manistee Lake. These lakes are lined with industries which empty their wastes, both liquids and solids into the receiving waters which empty directly into Lake Michigan. Fish may be caught in both of these lakes which are flushed and aerated by rivers, but which, nevertheless, carry a heavy load of pollution. One company located on the southern bank of Muskegon Lake has been ordered by the Water Resources Commission to reduce its waste load, but so far, it has not.

Other major sources of pollution in Manistee and Muskegon Lakes are oil slicks and garbage dumped from ferrying operations as well as manufacturing, chemical works, and inadequately treated sewage. Manistee Lake was the site of a steelhead fish kill in 1950 due to salts and organic wastes. The fish have since been restored, but the situation is still not aesthetically pleasing.

SANITARY DISPOSAL SYSTEMS

All Michigan cities with a population of 5,000 or over operate sewage treatment plants or maintain contractual arrangements for treatment with other municipalities. However, the cities of Lansing and Jackson are the only two cities with up-to-date treatment. As of July 1, 1967, the Michigan State Department of Public Health required that all sewage effluent be chlorinated 12 months of the year instead of only the warm weather months. The Water Resources Commission will require upgrading of all treatment facilities to meet water quality standards no later than June 1, 1972.

Three municipalities and ten industries use the waters of Lake Michigan directly for waste assimilation. Eight cities use Lake Michigan waters to wash intake filters and return the water to the lake without treatment. Of the municipalities, Gladstone (estimated population 5,400) uses primary treatment, Harbor Springs (estimated population 1,433) uses fine screen treatment, and Petoskey (estimated population 6,400) uses chemical precipitation. Of the ten industries emptying into Lake Michigan, the Water Resources Commission has rated six A (control adequate); one B (control provided--adequacy not established); one E (control inadequate); and one Esp (control inadequate, plans being prepared and studies underway).

INDUSTRIAL WASTE

The Michigan Water Resources Commission lists 621 industries and commercial establishments on its "Industrial and Commercial Pollution Status List as of April 1, 1967;" 344 of these are in the Lake Michigan drainage basin. The Commission issued 195 orders to restrict waste discharges of these plants or businesses; 151 were given A ratings, 88 had B ratings, 9 were given C ratings (no control—need not established); 44 had D ratings (control provided--protection unreliable); and 52 had E ratings. Included in these ratings it is noted that in 55 cases studies are underway, plans are being prepared, or construction is underway to control pollution problems. It is the Commission's intent that identified industrial waste problems be abated no later than June 1, 1970.

LARGE AND SMALL CRAFT

The number of incidents of oil pollution from vessels engaged in commercial navigation has increased in recent years. These incidents have ranged from a sinking of an oil barge on the Lake Michigan coast with the massive fouling of stretches of beaches for over 200 miles to the nearly continuous summertime complaints of swimmers smeared by heavy fuel oils. Increasing numbers of boats, both commercial and private, using Lake Michigan intensify the problems of raw sewage, garbage, and trash that come from these boats.

There are eight federal installations discharging raw sewage of human origin into the waters of Lake Michigan. The authority for controlling this lies with the Federal Water Control Administration.

APPROPRIATIONS

According to Norman Billings of the Water Resources Commission the federal money available to Michigan this year is $7 million. An additional $2 million is available from the State of Michigan. Under the existing formula for priorities, Detroit alone could use all of these funds. Legislation to amend the Federal Water Pollution Control Act to allow a program of research and demonstration for control of pollution is lakes was recently introduced by Congressman Guy VanderJagt. This legislation envisions an appropriation of $5 million for fiscal 1969. The Secretary of the Interior is authorized to enter into contracts with, or make grants to, public or private agencies or organizations or individuals for the conduct of research and demonstrations for the purpose of developing effective and practicable remedial measures; including without limitation, measures for the prevention of nutrient entry and the removal of existing nutrients and vegetation to improve the quality of the waters of the lakes of the United States. This bill is being referred to the House Public Works Committee.

The Agricultural Stabilization and Conservation Program makes direct payment for the installation of good soil and water practices of privately owned land. The Conservation Reserve makes a yearly cash payment to farmers for keeping cropland under permanent cover. This is noticeable in reforestration for shade and erosion control. The Michigan Water Resources Commission, under the present Water Pollution Control Act (Act 245, Public Acts of 1929, as amended) has the authority to protect and conserve the water resources of the state and the Great Lakes. The Michigan Department of Public Health is involved in the control of water pollution in the State of Michigan. The Water Resources Commission and the Health Department maintain regular surveillance programs to provide information for the evaluation of water quality. Federal agencies involved are the Department of Interior, Federal Water Pollution Control Administration, and the U. S. Army Corp of Engineers.

FLOOD CONTROL

Heavy spring rains falling over frozen or saturated ground with inadequate channel capacity have caused floods in the larger tributaries of the major streams in the Lake Michigan Basin: Grand, Muskegon, Kalamazoo, St. Joseph, Manistee, and Sturgeon Rivers. These floods have caused heavy damages to farms, businesses, and industries as well as to individual home owners.

Steps to control these floods have been taken in several ways. As of January, 1967, Watershed Protection Flood Prevention projects under PL 566 in the Lake Michigan Basin were:(1)

Approved for construction:
    East Branch of Sturgeon River, Dickinson County
    Little River, Menominee County
    Black Creek, Mason County
    Catlin Waters, Clinton County
    Fowlerville, Livingston County

Completed Projects:
    Muskrat Creek, Clinton County

Approved for Planning:
    North Branch of Chippewa River, Clinton and Shiawassee Counties
    Black Creek, Ottawa and Allegan Counties
    Lower Maple, Clinton and Gratiot County

Approved for Application:
    Buck Creek, Kent County
    Durham Creek, Mason County

Application Submitted:
    Battle Creek in Eaton and Calhoun County
    Libhard Creek, Ionia County

Application Disapproved:
    Ox Creek, Berrien County

Watershed Reviews:
    Galien River, Berrien County
    Paw Paw River, Berrien and Van Buren Counties
    Nottowa River, Calhoun County
    Portage River, Ingham and Jackson County
    Carrs Creek, Mason County
    W. Branch of Clam River, Osceola and Missaukee Counties
    Aetna Township, Missaukee County
    Bark River, Delta County

Corps of Engineers flood projects include:(2)

Underway: - Battle Creek, Kalamazoo
Not Started: - Grand at Lansing
    Kalamazoo River at Kalamazoo
    Grand at Grandville

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(1) From Watershed Progress in Michigan
(2) From Water Resources Development in Michigan (map)
    Authorized Federal Projects, Flood Control
    Underway - Battle Creek, Kalamazoo
    Not Started - Grand at Lansing, Kalamazoo River at Kalamazoo, Grand at Grandville

At present there is no flood plain zoning although there are two flood plain information studies underway being conducted by the Corps of Engineers - one concerning the Grand River and the other at Red Cedar River at Lansing.(3)

Local interests are asked to contribute to local flood protection projects in varying ways. Under PL 566, flood prevention construction costs and engineering costs are covered by federal funds. In projects under the Corps of Engineers, the local protection works are turned over to non-federal authorities for maintenance, as are small resevoirs with only localized effect.

The frequency of floods varies greatly from river basin to river basin and year to year. In PL 566 areas (e.g. Muskrat Creek) the average is estimated to be two every five years. Flood plain zoning is considered to be practicable in the Basin. Officials of the Michigan Soil Conservation Service state that such zoning is "practicable in most watersheds, especially in watersheds where cities or urban development is taking place. In rural areas, zoning is practicable, whereby the flood plain is zoned to such use that flood damages are reduced to a minimum."(4)

The Soil Conservation Service has not yet made any estimates of the overall cost of flood control measures.

Present flood control plans provide for the creation of upstream river storage reservoirs under PL 566 whenever adequate storage sites are available and a need for storage is required. This type of action is also possible under Michigan Law, State Act 253 of 1964 (Local River Management Act) and under the Corps of Engineers projects. It is required that all structure sites and reservoirs must be economically justifiable and feasible before work of any type begins.(5)

Listed below are the flood control functions of involved agencies:

Army Corps of Engineers: This agency develops comprehensive plans for the water and land-related resources of the region and identifies the programs and projects that will best meet the needs for flood control..(6) The objectives of flood control works is to regulate flood flows and thus prevent flood damage, accomplished with reservoirs, local protection works, or combinations of both. Local protection is provided by channel enlargement, removing obstructions, constructing levees and walls, providing channel paving, and stabilizing banks with stone or combinations of these methods.

Department of Conservation: Act 17, 1921, Section 3, declares "the duty of the Conservation department to protect and conserve the natural resources of the state of Michigan."(7)

Michigan Water Resources Commission: A division of the Department of Conservation, this Commission is charged with the protection and conservation of the water resources of the state and is the state agency to cooperate and negotiate with other governments and agencies in matters concerning the water resources of the state.(8)

Soil Conservation District: A department within the Department of Agriculture, the District works for the conservation of the soil and soil resources of the state and for the control and prevention of soil erosion and control floods. The State Soil Conservation Committee created under Act 297 administers watershed planning funds appropriated by the state legislature and accepts and approves or disapproves watershed applications (under PL 566) for the governor.(9)

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(3) Ibid. Flood Plain Information Studies. Underway -Grand River, Red Cedar River at Lansing.

(4) Letter from Verne Bathurst, State Conservationist, Soil Conservation Service.

(5) Ibid.

(6) Ibid.

(7) Michigan Laws Relating to Water. p. 299

(8) Ibid. p. 311

(9) Ibid. p. 287

IRRIGATION

In the past the use of Lake Michigan waters for agricultural irrigation has been of little significance to the total water use picture. Less than 400 acres were known to depend on Lake Michigan as a source for irrigation water. The greatest amount of this irrigated acreage, approximately 300 acres, is located in Leelanau and Grand Traverse Counties and is privately operated and financed.(1)

The Great Lakes Irrigation Bill passed in 1967 (Senate Bill 222) permits supplementary irrigation utilizing Great Lakes waters and will probably see greater acreage involved in irrigation projects. Initial steps in forming an association under the new law for this purpose are being undertaken in Grand Traverse County.

According to the Census of Agriculture there are approximately 32,200 acres under irrigation. However, they are presently all privately constructed irrigation facilities, and obtain the majority of their water from wells and streams.(2)

At present there are irrigation projects authorized but not yet constructed in the basin of the East Branch of the Sturgeon River, Dickinson County. Reasons for the proposed project, other than the land and food needs of the population, are involved. It is a multiple-purpose project which would provide flood control, recreation and irrigation, primarily for Russet Burbank potatoes. The plans for sharing the costs are as follows: PL 566 will provide all technical engineering service and 50% of the construction costs. Other than PL 566 funds will provide the other 50% of the construction costs, and all land, easement and rights-of-way and administration of contract costs. Without government subsidies, the project would probably not be built.

The repayment period for the project is not yet determined. The sponsors are eligible for loans up to 50 years at federal long-term borrowing rates through FHA. All of the costs allocated to irrigation are to be repaid by the users of the water. None of the revenues from power are assigned for repayment beyond the water users' ability to pay. No portion of the revenues from furnishing water for municipal water supply or miscellaneous purposes will be assigned for repayment beyond the water users' ability to pay.

The acreage limitation of 695 acres for the project will be enforced.

The law clarifies the ownership of water and water rights. However, Michigan laws have been updated in recent years to provide ways of obtaining the most efficient use of these water resources. Act 297, Sec. 282.8 provides for obtaining the consent of the owner.

Generally, in a PL 566 project the following federal, state, and local agencies are concerned:

Federal: Soil Conservation Service, Forest Service, Fish and Wildlife Service, Farmers Home Administration, Corps of Engineers, Agricultural Stabilization & Conservation Service.

State: State Soil Conservation Committee, Water Resources Commission, Department of Conservation, Highway Department.

Local: Local sponsors, Soil Conservation Districts, County Highway Department, Water Users' Associations, Drainage Districts.

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(1) Michigan Water Resources Commission, Water Resource Uses...for Lake Michigan, p. 46.

(2) Communication from Verne Bathurst, State Conservationist of Soil Conservation Service, p. 5.

POWER

For the purpose of analyzing power needs for the state, the Michigan Public Service Commission has divided the state into three zones--Upper Peninsula, Lower Peninsula, and Southwestern Michigan. We were unable to locate useful information relating to the Upper Peninsula, although it is understood that several small hydro installations are in operation there. Most of the power needs of Southwestern Michigan are supplied through transmission lines owned by the American Electric Power Company running through northern Indiana.

Until November 27, 1967 when Consumers Power Company announced plans for a huge hydro-electric plant to be built on the bluffs above Lake Michigan at Ludington, it was thought that hydro-electric installations in lower Michigan were of lesser importance in supplying power needs than coal-fired or nuclear steam generation systems. In fact, according to information received from Consumers Power Company, 16 hydroelectric plants supply only about 4% of the system's needs, although in 1912 Consumers operated 33 hydro plants which generated the bulk of the area's requirements.

Of these 16 plants, 10 are in the Lake Michigan Basin. There are two at Sabin and Boardman in the Traverse City area; one at Hodenpyl on the Manistee River and at Tippy on the Pine River. Three hydro plants are located on the Pine River in Newaygo and Mecosta counties and two more serve the Grand Rapids area with a third plant situated on the Looking Glass River near Webber. Many of these plants are located on river lands adjacent to forest sites, and Consumers claim to have set aside land for recreational use and to have inaugurated tree planting programs.

Eventually three nuclear generating stations will be located on Lake Michigan's shoreline in Michigan. One at Big Rock Point, north Of Charlevoix, is already in operation; another at Palisades, just south of South Haven, is under construction; and the third one is proposed by American Electric Power Company in the Bridgman area at a cost of $300 million dollars. While these plants do not use water power in the conventional sense, the lake water is utilized in cooling the reactor. It is estimated that 742 million gallons per day will be withdrawn by the Palisades plant for cooling before being returned to Lake Michigan. Estimates for the Bridgman plant are not available at this time. The quality of the water will not be changed except for its temperature. Under a new water quality standard, a new use statement must be filed for these plants with the Michigan Water Resources Commission. If the Commission determines it is necessary, cooling towers may be required of nuclear energy plants to insure the maintenance of lake temperatures not to exceed 15 degrees above ambient temperatures.

The proposed hydro-electric plant at Ludington, when completed in 1973, will have an electrical capacity of 1,872,000 kilowatts. A pumped storage plant on a 1,000 acre site four miles south of Ludington on the shore of Lake Michigan will be built. The project will include an upper reservoir with a circumference of about six miles, an average depth of about 120 feet and a capacity of about 27 billion gallons of water; six reversible-pump turbine generator units; steel pipes, 1,100 feet long, carrying water from the upper reservoir to the generators. The reservoir will be constructed on a bluff about 300 feet above lake level. During periods of slow electrical demand, the generators will pump water out of Lake Michigan into the reservoir at a rate of several million gallons a minute. When demand for electrical power is high, the water will flow out of the reservoir at a rate of 33 million gallons a minute. The company does not expect any effect on the level of Lake Michigan.

COMMERCIAL NAVIGATION

Commercial navigation is of great significance to the past, present and the future economy of the Great Lakes region. In the past, settlement patterns and the locations of cities and industrial complexes were either determined by proximity to lake commerce or strongly influenced by it. Much of today's commercial and industrial activity of the Great Lakes region is geared to lake shipments. The potential of the St. Lawrence Seaway is being fulfilled and promises to provide even closer links between the Great Lakes and world markets. With each passing season there are increases in direct foreign shipments, both to and from lake ports.

Although there were few adequate natural harbors on Lake Michigan, improvement of navigation facilities paralleled that of the development of the commercial capabilities. In early times, only canoes, Mackinaw boats and other small sailing vessels used the harbors provided by western Michigan border lakes (Muskegon, White, Pere Marquette, etc.) and these were not greatly hindered by the always present sand bars which partially blocked the entrances of these lakes. But as commerce increased and larger vessels began using Lake Michigan and the developing ports, navigation improvements became a necessity. At first, local citizens assumed the responsibility for these improvements. Sand bars were cut through and lined with cribs or wood piles. This was followed shortly thereafter by the first breakwaters--timber cribs, sunk to the lake bottom, filled with rocks and timber-decked. Some of these early efforts remain as a part of the substructure of the existing breakwaters. At South Haven (1868), Holland (1860), and Grand Haven (1857) these early structures have passed or are near the century mark.

As the costs and engineering capabilities exceeded the abilities of local citizens, at the direction of the Congress, the U. S. Army Corps of Engineers assumed responsibility for harbor and channel improvements. A federal assistance project was authorized for Holland as early as 1852. To date 22 federal projects have been authorized in Michigan on Lake Michigan. Expenditures for these projects have been substantial--over $44,000,000. These costs have been incurred from new work (over $13,000,000), maintenance ($24,447,000) and rehabilitation ($6,575,467). The relatively high figure for maintenance results from annual dredging required at many of the harbors. Littoral movement of shore sediments is a process which is continually filling artificially deepened harbor entrances.

Current freight movements on Lake Michigan are based on intra-state, interstate and international commerce. In 1964, 22,422,595 tons of freight were moved at Michigan ports on Lake Michigan.

Total tonnage ranged from highs of 7,707,940 at Escanaba; 3,904,089 at Ludington; 3,349,682 at Muskegon; 2,598,375 at Grand Haven to lows of 130 tons from North Manitou Island to no commerce reported at the ports of Pentwater, Saugatuck and Cedar Rivers; all considered commercial harbor facilities.

An important segment of this movement is by railroad car ferry. Since Lake Michigan provides a geographical interruption to cross-continental rail routes, the ferry service is an essential link in the rail transportation system. Three railroads operate ferry service across Lake Michigan.

The are:

The Grand Trunk-Western, Muskegon to: Milwaukee, Wisconsin.
The Chesapeake & Ohio, Ludington to: Milwaukee, Wisconsin, Manitowoc, Wisconsin and Kewaunee, Wisconsin.
The Ann Arbor, Frankfort to: Manitowoc, Wisconsin, Kewaunee, Wisconsin and Menominee and Manistique, Michigan.

U.S. ARMY CORPS OF ENGINEERS HARBOR PROJECTS

The Corps of Engineers, in their annual report on Water Resources Development in Michigan, published January 1, 1967, have listed 19 projects completed concerning Lake Michigan navigational facilities.

Some of these are:

Grand Haven harbor and Grand River - Currently handling an excess of 2 1/2 million tons of commerce annually. The harbor depth is 21 feet and the width is 300 feet. From 1960 to 1964, average tonnage was 2,794,000.

The facilities of the harbor have been improved by dredging a wide, deep channel, and constructing protective piers and revetments. A shallow-draft barge channel goes about 15 miles up river. The river channel is 8 feet deep and 100 feet wide.

Total costs to June 30, 1966 were $7,632,484; of which $972,140 was for new work; $5,846,731 was for maintenance, and $813,613 was for rehabilitation.

Ludington Harbor - The project dates back to 1867, consists of a deep channel, 18 feet deep by 100 feet wide, with outer breakwaters, inner piers and revetments. Total commerce for a five-year period, 1960 to 1964, averaged $3,904,000 tons.

Total costs for the existing project to June 30, 1966, were $4,802,666, of which $1,036,086 was for new work, $3,408,666 for maintenance and $357,914 for rehabilitation.

Ludington is one of the main car and railroad ferry ports.

Muskegon Harbor - One of the most progressive and busiest ports on the Great Lakes, maintaining St. Lawrence Seaway depths in the channel which is 27 feet deep and 200 feet wide.

Total tonnage for the five-year period, 1960 to 1964, averaged 3,518,000 annually.

Total costs through June 30, 1966 for the project were $3,836,277; of which $2,298,702 was for new work, $1,091,720 for maintenance, and $445,855 for rehabilitation.

Some other five projects now underway on Lake Michigan ports are:

Frankfurt Harbor - A channel 18 feet deep and 143 feet wide.

Average annual tonnage from 1960 to 1964 was 1,305,000, with most of the tonnage being carried by railroad car ferries.

Total cost of the completed portion of the project has been $1,747,000, with $1,257,570 for maintenance and $274,420 for rehabilitation.

Cedar River Harbor - Plans call for an entrance channel 100 feet wide and 10 feet deep, approximately 2,100 feet long to the mouth of Cedar River, with an inner channel in the river, 1,400 feet long, 80 feet wide and 6 feet deep upstream to connect with the inner bridge channel. Estimated costs of the modifications will be $736,000 in federal monies, $155,000 in non-federal monies. There is no waterborne commerce at Cedar River Harbor.

Leland Harbor - Construction of a new breakwater, anchorage and maneuvering areas and an approach channel.

Estimated costs of the modifications will be $860,000; $460,000 in federal funds, and $400,000 in non-federal funds.

Menominee Harbor - The project almost finished with the exception of those modifications authorized in 1960 consists of: parallel piers, channel dredged, a municipal wharf, and an enlarged turning basin. The remaining work is now classified as inactive.

Total costs of the project through June 30, 1966, was $2,911,000, of which $482,000 was for new work and $1,352,000 for rehabilitation of piers.

Waterborne commerce consists primarily of car-ferry traffic. Total tonnage in 1964 was 454,000.

New Buffalo Harbor - The project calls for north and south breakwaters, entrance channel 850 feet long, a river channel 1,250 feet long.

The estimated cost of the project is $1,885,000 as of July, 1965, with $755,000 of this cost in federal funds.

A project waiting for receipt of funds and local contribution is that of Cross Village Harbor.

Menominee Harbor and River and South Haven Harbor presently are being surveyed and reports being reviewed for Small Navigation Projects.

At least 12 other projects are currently being surveyed, are waiting funds from the federal government, or are awaiting required local participation.

Sources: Michigan Water Resources Commission, Michigan Department of Conservation, "Water Resource Uses for Lake Michigan."

U. S. Army Corps of Engineers. "Water Resources Development in Michigan, 1967."

WATERSHED MANAGEMENT

At present, the Lake Michigan basin has no overall watershed management since such management involves more than one state. Within the Michigan portion of the drainage basin, Act 253 enables units of local government to cooperate in planning and carrying out a coordinated water management program in the watershed which they share. Presently, the only river which has such a watershed management council is the Grand River. In addition, watershed projects under PL 566, the Watershed Protection and Flood Prevention Act of 1954, have been authorized.

AUTHORIZATION

The Watershed Protection & Flood Prevention Act (PL 566) was enacted by the Congress in 1954. The Act was subsequently amended in 1956, 1958, 1960, 1962, and in 1965. The Act, as amended, authorizes the Secretary of Agriculture to provide technical, cost sharing and credit aid to local organizations in planning and carrying out works of improvement for (1) flood prevention, (2) agricultural water management, (3) fish and wildlife development, (4) recreational development, and (5) municipal and industrial water supply purposes, both for present and future use.

Such authorization provides broad authority for assistance in the development of projects serving multiple purposes. Local sponsoring organizations are encouraged to consider watershed project development to serve all possible beneficial uses.

Eligible local sponsoring organizations include any state or local agency having authority, under state law, to carry out, maintain and operate watershed works of improvement. In Michigan, the State Attorney General has determined that the following Michigan units of government have such authority:

- Townships
- Cities (if their charter (permits)
- County Drainage Districts
- Inter-County Drainage Districts
- Water Management Districts
- Michigan Department of Conservation
- Soil Conservation Districts
- Board of County Road Commissioners (when authorized by 2/3 vote of County Board of Supervisors)

Successful watershed projects, utilizing assistance as provided by the Act, require close cooperation and teamwork among a number of local, state and federal agencies. Carrying out of this phase of the soil and water conservation program in Michigan has been achieved by cooperation and assistance of the following offices and agencies:

- Local Sponsoring Organizations
- Office of the Governor
- Michigan Department of Agriculture, State Soil Conservation Committee
- Michigan Department of Conservation, Water Resources Commission
- Michigan Cooperative Extension Service
- Michigan State University Department of Agricultural Engineering
- Agricultural Stabilization and Conservation Service, U.S. Department of Agriculture
- Farmers Home Administration, U.S. Department of Agriculture
- Forest Service, U.S. Department of Agriculture
- Soil Conservation Service, U.S. Department of Agriculture
- Corps of Engineers, U.S. Army
- Fish & Wildlife Service, U.S. Department of Interior

U.S. Department of Health, Education & Welfare
Bureau of Mines, U.S. Department of Interior

A number of private organizations interested in conservation and agriculture have made contributions, also.

SOIL AND WATER CONSERVATION ACCOMPLISHMENTS IN MICHIGAN WATERSHEDS APPROVED FOR OPERATIONS

District Cooperators	1,450
Basic Farm Conservation Plans	1,125
Conservation Cropping Systems, acres	78,820
Cover & Green Manure Crops, acres	24,754
Crop Residue Use, acres	92,650
Diversion, lin. ft.	5,525
Farm Ponds	84
Field Windbreak, lin. ft.	185,961
Grade Stabilization Structures	529
Hedgerow Planting, lin. ft.	72,250
Grassed Waterway or Outler, acres	86
Land Smoothing, acres	12,303
Livestock Exclusion, acres	7,318
Minimum Tillage, acres	41,058
Drainage - Main or Lateral, lin. ft.	405,416
Tile Drains - lin. ft.	13,596,840
Streambank Protection, lin. ft.	14,463
Wildlife Habitat Preservation, acres	4,175
Wildlife Wetland Development, acres	47
Wildlife Habitat Development, acres	988
Wildlife Wetland Preservation, acres	587
Woodland Harvest Cutting, acres	2,445
Woodland - Thinning, acres	244
Cropland to Grassland, acres	330
Cropland to Wildlife-Recreation, acres	722
Cropland to Other, acres	1,618
All Other Uses to Cropland, acres	1,729
All Other Uses (except cropland) to Wildlife-Recreation, acres	1,591

Quantities of a number of other soil and water conservation practices also have been applied in watersheds.

Applications received - 41
Projects authorized for planning - 19
Projects completed - 3
Applications approved - 34
Projects authorized for construction - 15

COMPLETED PROJECTS

Little Black River Watershed

Location - Cheboygan County

Size - 17,130 acres

Sponsors - City of Cheboygan, Cheboygan County Soil Conservation District

Problems - Annual flooding in the city of Cheboygan caused primarily by snowmelt. Some flooding of agricultural lands.

Remedial Measures - Four floodwater retarding structures, 1.4 miles of floodwater diversion and channel improvement in addition to on the land treatment measures applied under the Cheboygan County Soil Conservation District program through district agreements.

Status - All planned structural and land treatment measures have been installed. The Project was completed in July, 1964.

Muskrat Creek Watershed

Location - Clinton County

Size - 7,654 acres

Sponsors - Clinton County Soil Conservation District, Morris Drain Drainage District

Problems - Poor agricultural drainage outlets and flooding of agricultural lands.

Remedial Measures - Land treatment and 4.6 miles of multiple purpose channel improvements (flood prevention and agricultural water management).

Status - All planned structural and land treatment measures have been installed. The project was completed in October, 1963.

PROJECTS AUTHORIZED FOR INSTALLATION OF LAND TREATMENT AND STRUCTURAL MEASURES

Little River Watershed

Location - Menominee County

Size - 37,973 acres

Sponsors - Little River Drainage District, Menominee County Soil Conservation District

Problems - Poor agricultural drainage outlets and flooding of agricultural lands and roads and bridges.

Remedial Measures - Land treatment and 5.7 miles of multiple purpose channel improvements (flood prevention & agricultural water management).

Status - Start of construction work awaits local arrangements for needed land rights.

Black Creek-Mason Watershed

Location - Mason County

Size - 6,678 acres

Sponsors - Black Creek Drainage District Mason County Soil Conservation District

Problems - Flooding of agricultural lands, and poor agricultural drainage outlets.

Remedial Measures - Land treatment and 6.3 miles of multiple purpose channel improvements (flood prevention and agricultural water management).

Status - Preparation of final designs for the proposed improvements is being delayed pending completion of drainage district proceedings.

Catlin-Waters, Reynolds-Session Watershed

Location - Clinton County

Size - 2,800 acres

Sponsors - Clinton County Soil Conservation District Catlin-Waters Drainage District

Problems - Flooding of agricultural lands and poor agricultural drainage outlets.

Remedial Measures - 4.3 miles of multiple purpose channel improvement (flood prevention and agricultural water management).

Status - Preparation of final design plans is underway.

East Branch of Sturgeon River Watershed

Location - Dickinson County

Size - 83,980 acres

Sponsors - Dickinson Soil Conservation District
Dickinson County Road Commission
East Branch of Sturgeon River Water User's Association

Problems - Flooding of roads, bridges, rural residences, and in communities of Foster City & Hardwood. Need for water supply for supplemental irrigation of agricultural lands, and need for recreational developments.

Remedial Measures - Land treatment and three multiple purpose structures (one for flood prevention, and recreational purposes, one for flood prevention, irrigation and recreational purposes, and one for irrigation and recreation).

Status - Preparation of final design plans is underway.

PROJECTS AUTHORIZED FOR PLANNING UNDER PL-566

Upper Maple River Watershed

Location - Shiawassee, Clinton & Gratiot

Size - 199,700 acres

Sponsors - Shiawassee County Soil Conservation District
Clinton County Soil Conservation District
Gratiot Soil Conservation District
Maple River Drainage District

Problems - Flooding of agricultural lands, poor agricultural drainage outlets, and a need for recreation and fish and wildlife developments.

Remedial Measures - Proposed measures under consideration include 38.9 miles of multiple purpose channel improvement, 16.2 miles of levees, pumping plants and two multiple purpose dams (flood prevention and recreation or fish and wildlife) and land treatment.

Status - Field Surveys and investigations necessary for preparation of a work plan are partially completed.

PLANNING TERMINATED OR SUSPENDED

Black Creek Watershed

Location - Kent, Ottawa, and Allegan Counties

Size - 17,600 acres

Sponsors - West Ottawa Soil Conservation District
Northwest Kent Soil Conservation District
Wagner Inter-county Drainage District

Problems - Flooding of agricultural lands and inadequate agricultural drainage outlets.

Remedial Measures - One floodwater retarding structure, 9.2 miles of multiple purpose channel improvements (flood prevention and agricultural water management) and land treatment.

Status - Planning activities have been suspended until such time as watershed residents submit a petition requesting installation of improvements and a board of determination finds improvements necessary.

GRAND RIVER WATERSHED COUNCIL

Basin Description

The Grand River Basin, Michigan, is located in the western part of the lower peninsula of the state. It drains into Lake Michigan. Land area of the basin is about 5,600 square miles, or 3.6 million acres.

The basin contains approximately 1.1 million persons. It includes three of Michigan's eleven Standard Metropolitan Statistical Areas: Grand Rapids, Lansing, and Jackson.

Lansing, although primarily dependent on the auto industry, is also a center of government and education. It is the capital of Michigan, and its largest suburb, East Lansing, is the site of Michigan State University.

Grand Rapids has a diversified industrial base, and is the wholesale and retail trade center of western Michigan. Fabricated metal products, furniture, and instruments are the city's most important products, but it manufactures an array of other goods, both durable and nondurable, including bakery products, textiles and leather, electrical machinery, and household refrigerators and freezers.

Jackson is dominated by the transportation equipment industry. It manufactures parts and equipment for automobiles and airplanes, including tires and tubes. Long a supplying city for the automobile industry, it has developed along lines that have encouraged diversification into the fields of electrical machinery and electronic components.

The basin as a whole is characterized by an emphasis on manufacture of durable goods. Heavy industry in the basin is closely integrated with that of the rest of the state.

Watershed Council History and Functions

The Michigan Grand River Watershed Council was officially organized in June, 1966, through proviso of Act 253, the Local River Management Act, Michigan, for the benefit of the 59 governmental units located in the Grand River Basin.

Its functions or purposes are:

> Conduct, or cause to be conducted, studies of water resources of the Grand River Watershed.
>
> Prepare periodic reports concerning trends in water use and availability, emerging water problems and recommendations for appropriate public policies and programs necessary to maintain adequate water resources for the Grand River Watershed.
>
> Conduct informational programs to explain the need for effective water management practices and promote the support of all public agencies and private organizations to preserve the water resources of the Grand River Basin.
>
> Make plans for development and management of water resources and recommend the creation of a river management district or districts in the Grand River Watershed.

Advise agencies of federal, state, and local government as to the council's view of the problems and needs of the Grand River Watershed.

Cooperate with federal, state, and local agencies in providing stream gauges, water quality sampling stations, or other water resource data-gathering facilities or programs that aid the Council in its responsibility for studying and reporting on water conditions.

The Grand River, from its source in Hillsdale County and its mouth in Lake Michigan at Grand Haven is 260 miles long. Its tributary streams and rivers are:

Rogue River, Flat River, Maple River, Looking Glass River, Red Cedar River, Portage River and the Thornapple River. The average mean rainfall is 31 inches, and soils of the basin run the gamut of loams, sandy loams, sands, clays and combinations of the above soils; silts, mucks and peats.

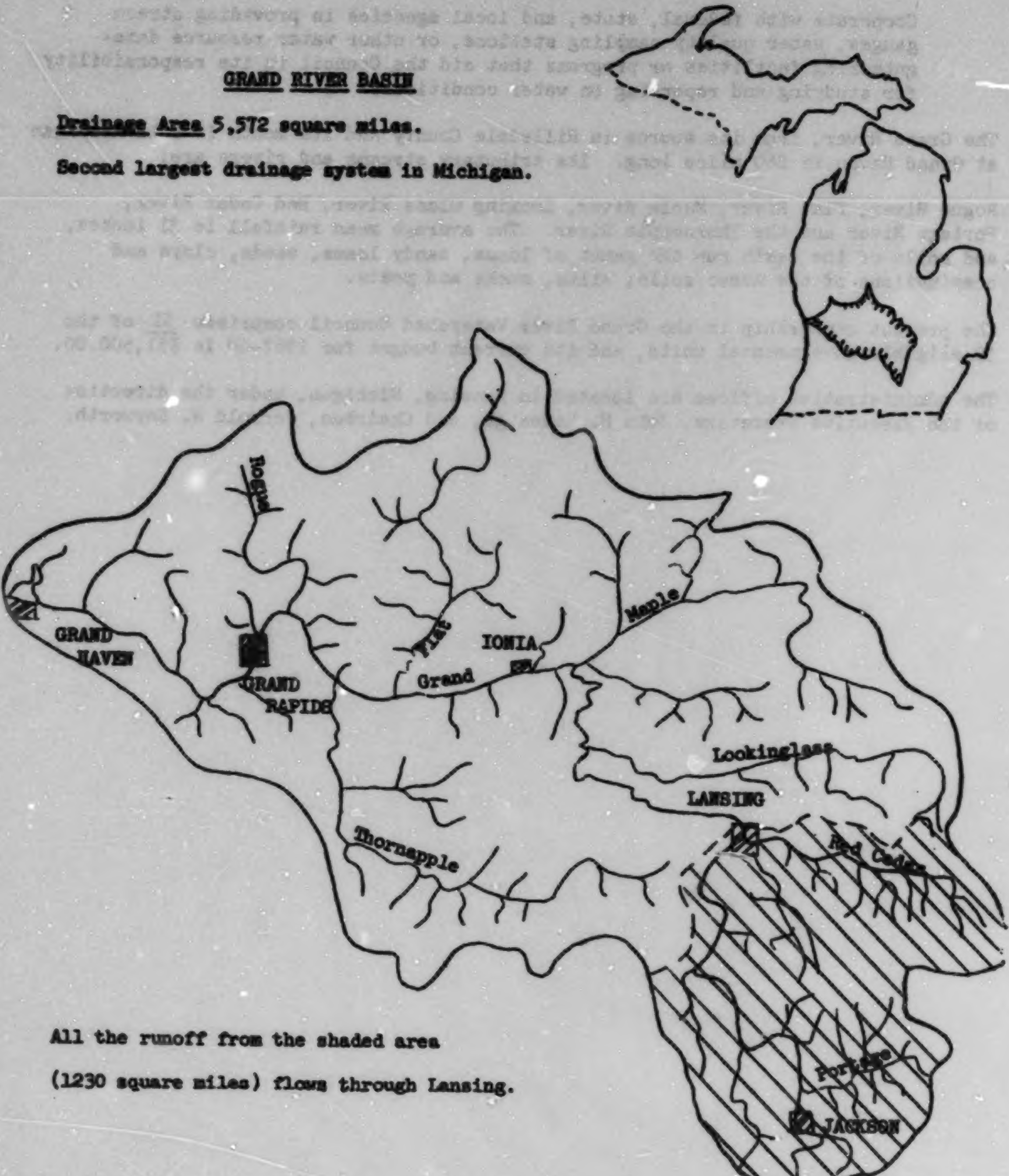
The present membership in the Grand River Watershed Council comprises 51 of the 59 eligible governmental units, and its current budget for 1967-68 is $51,500.00.

The administrative offices are located in Lansing, Michigan, under the direction of the Executive Secretary, John H. Kennaugh, and Chairman, Jerrold H. Keyworth.

GRAND RIVER BASIN

Drainage Area 5,572 square miles.

Second largest drainage system in Michigan.


Rogue
GRAND HAVEN
GRAND RAPIDS
Flat
IONIA
Grand
Maple
Lookinglass
LANSING
Thornapple
Red Cedar
Portage
JACKSON

All the runoff from the shaded area (1230 square miles) flows through Lansing.

RECREATION, FISH, AND WILDLIFE

There are 68 state and county parks in the Lake Michigan Basin in Michigan. In addition we have 3,121 miles of shoreline on both Lake Michigan and 11,037 inland lakes (of over 10 acres) plus 36,350 miles of streams. Two major wildlife refuges totaling 100,000 acres are located in the eastern upper peninsula. There are also 735 state owned water access sites and 64 game and wildlife areas (255,000 acres) and 3,500 miles of canoe streams.

There are 2.5 million acres of national forests and "managed" land for timber and recreation. The Sylvania Tract in the upper peninsula is a major recent addition. According to 1964 estimates, there are 4.7 million visits made per year. Fifty per cent of all lands within federal forest boundaries are privately owned. Michigan has the largest state forest system in the nation with 3.7 million acres in 29 units. Eighty per cent of these lands have come to the state through tax reversion. The rest have been purchased for a total cost since 1903 of $48 million.

There are 7.5 million visits paid to the state forests every year. Multiple use management is paying off. The annual dividend to the people of Michigan totals $100 million. Timber production, game management, and general public recreation are the major objectives, but lands are used for sites for oil wells, power and pipe lines, aircraft landing fields, sawmills, grazing, research, and special preserves. Experts say that in the years ahead there will be need for a formalized system of designating land uses, built around periodic reviews which will permit changes when and where needed.

BOATING

Generally, the types of pleasure craft found in the Lake Michigan Basin are outboard motor boats, inboard motor boats, and sailboats.

The above craft range from 11-foot day-sailers, rowboats, and fishing boats to 50-foot yachts. A recent survey showed that the total number of craft of these types totaled 121,440. The county with the largest boat ownership was Kent County with 20,851. Second was Kalamazoo County with 10,520.

Mooring--Private and Marina

The demand for mooring can be classified into two groups, private sector and marina sector.

The private sector consists of those slips and moorings located at cottages of individually owned waterfront property. A mooring in this sector can be nothing more than property owned and available to the owner with conditions that are right for anchoring a boat offshore.

The marina sector consists of those slips provided by commercially and publicly operated marinas and by yacht clubs. Few marinas offer seasonal moorings other than slips.

The private sector provides most of the moorings. This is especially true in the inland lakes. Larger craft need and use marina facilities. As Great Lakes boating increases, more marinas will be necessary.

A shift in emphasis in mooring needs may take place by 1980 from the inland lakes to Lake Michigan. Moorings have been in the greatest demand in the inland lakes and streams up to this time. However, three important things are changing this:

1. Planting of the coho salmon in Lake Michigan,
2. Inland property is becoming less available,
3. Inland lakes are becoming very crowded.

All indications are that a shift will take place, but when and to what extent is not yet known. If this shift takes place, marinas will play an increasing role for moorings on Lake Michigan. These are costly on a large lake because of the artificial conditions that must be created. Breakwaters and similar protective devices, carefully constructed slips and piles, and extensive dredging of channels and portions of the harbors will be necessary periodically.

Launching sites are becoming more and more crowded in all inland and Lake Michigan areas so that many boaters must be turned away, especially on holidays. The situation will be severe if more launching sites are not provided soon.

Harbors

Harbors in the Lake Michigan Basin with public or private boating facilities.

1. New Buffalo
2. St. Joseph-Benton Harbor
3. South Haven
4. Saugatuck
5. Holland
6. Grand Haven
7. Muskegon
8. White Hall
9. Pentwater
10. Ludington
11. Manistee
12. Portage Lake
13. Arcadia
14. Frankfort
15. Leland
16. South Manitou (island off Leland)
17. Suttons Bay
18. Northport
19. Greilickville
20. Traverse City
21. Elk Rapids
22. Charlevoix
23. East Jordon
24. Boyne City
25. Petoskey
26. Harbor Springs
27. Mackinaw City
28. St. Ignace
29. Beaver Island
30. Manistique
31. Gladstone
32. Escanaba
33. Cedar River
34. Menominee

Major harbors in Michigan and in the Lake Michigan Basin

1. Escanaba
2. Frankfort
3. Manistee
4. Ludington
5. Muskegon
6. Grand Haven
7. Benton Harbor

CAMPING

Western Michigan has 21 state park areas with a total of more than 4,200 campsites. All but four have electricity.

The 14 national forest campgrounds are concentrated in Oceana, Mason, Lake, Manistee, and Wexford Counties.

The 26 state forest campgrounds are found in Allegan, Lake, Missaukee, Manistee, Benzie, Grand Traverse, Newaygo, Charlevoix, and Kalkaska Counties.

The Upper Peninsula in the Lake Michigan Basin has a total of five state parks, 14 national forests, and 18 state forests.

Upper Peninsula Campgrounds and Facilities

State Parks

Delta County
Fayette State Park on Big Bay de Noc; swimming, fishing, water.

Mackinac County
Detour State Park, 17 miles east of Cedarville; swimming.
Straits State Park, Straits of Mackinac at St. Ignace; electricity, water.

Menominee County
Wells State Park, Green Bay, Lake Michigan; swimming, electricity, water.

Schoolcraft County
Indian State Park, Indian Lake; swimming, fishing, electricity, water.

National Forests

Delta County
Pole Creek Lake, Hiawatha National Forest; swimming, boat launch, trailer park, tent sites, campstoves, water, fishing.

Peninsula Point, Hiawatha National Forest; swimming, boat launch, campstoves, tent sites, water.

Haymeadow Creek, Hiawatha National Forest; campstoves, water.

Flowing Well National Forest; swimming, trailer park, tent sites, campstoves, water.

Corner Lake, Hiawatha National Forest; boat launch, campstoves, water.

Camp Seven Lake, Hiawatha National Forest; swimming, boat launch, trailer park, tent sites, campstoves, water.

Mackinac County

Lake Michigan, Hiawatha National Forest; swimming, trailer park, tent sites, campstoves, water.

Brevort Lake, Hiawatha National Forest; swimming, launch sites, trailer park, campstoves, water.

Foley Creek, Hiawatha National Forest; trailer park, camp sites, campstoves, water.

Carp River, Hiawatha National Forest; trailer park, tent sites, water, campstoves.

Schoolcraft County

Colwell Lake, Hiawatha National Forest; swimming, boat launch, water, campstoves, tent sites, trailer park.

Petes Lake, Hiawatha National Forest; swimming, boat launch, trailer park, tent sites, campstoves, water.

Indian River, Hiawatha National Forest; campstoves, water.

Little Bass Lake, Hiawatha National Forest; boat launch, campstoves, water.

State Forests

Dickinson County

Lower Dam, Sturgeon River State Forest, Escanaba River; trailer park, campstoves, tent sites, water.

West Branch, Sturgeon River State Forest, west branch of the Escanaba River; trailer park, tent sites, campstoves, water.

Little Kates Lake, Sturgeon River State Forest; fireplaces, water.

Mackinac County

Little Brevort, Lake Mackinac State Forest; swimming, boat launch, tent sites, trailer park, campstoves, water.

Hog Island Point, Mackinac State Forest; on Lake Michigan, swimming, boat launch, trailer park, tent sites, water, campstoves.

Black River, Mackinac State Forest; trailer park, tent sites, campstoves, water.

Milakokia Lake, Mackinac State Forest; swimming, boat launch, trailer park, tent sites, campstoves, water.

Garnet Lake, Mackinac State Forest; swimming, trailer park, tent sites, boat launch, campstoves, water.

Menominee County

Big Cedar River, Menominee State Forest; trailer park, tent sites, campstoves, water.

Schoolcraft County

Mead Creek, Manistique River State Forest; trailer park, tent sites, campstoves, water.

Merwin Creek, Manistique State Forest; trailer park, tent sites, campstoves, water.

West Branch, Manistique River State Forest; trailer park, tent sites, campstoves, water.

Canoe Lake, Grand Sable State Forest; boat launch, trailer park, tent sites, campstoves, water.

Cusino Lake Grand Sable State Forest; swimming, trailer park, boat launch, tent sites, campstoves, water.

N. Gemini Lake, Grand Sable State Forest; swimming, boat launch, trailer park, tent sites, campstoves, water.

Ross Lake Grand Sable State Forest; swimming, trailer park, boat launch, tent sites, campstoves, water.

Fox River, Grand Sable State Forest; trailer park, tent sites, campstoves, water.

Stanley Lake, Grand Sable State Forest; swimming, boat launch, trailer park, tent sites, campstoves, water.

Lower Peninsula Campgrounds and Facilities

In western Michigan in the lower peninsula, there are camping facilities in all counties in the Lake Michigan drainage basin. Generally, the facilities are more complete than in the upper peninsula. Most include those facilities mentioned in the upper peninsula campsites plus swimming; bathhouse, laundry and shower facilities; and electricity outlets. The larger ones include nature tours, nature centers, libraries, and picnic areas.

State Parks

- Boyne City
- Cadillac
- Carp Lake
- Grand Haven
- Holland
- Benzie
- Interlochen
- Ludington
- Michilimackinac
- Orchard Beach
- Silver Lake
- Yankee Springs
- Muskegon
- Newaygo
- Charles Mears at Pentwater
- Warren Dunes
- Traverse City
- White Cloud
- Van Buren
- Fort Custer
- D. H. Day

State Forest Campgrounds

Baldwin--2
Barryton
Beaver Island
Cadillac
Charlevoix
Copemish
Fife Lake--2
Honor
Interlochon
Kalkaska--2
Kingsley--2
Lake Ann
Houghton Lake--3
Pere Marquette--2
Thompsonville

National Forest Campgrounds

Baldwin--4
Cadillac--2
Harrietta
Hesperia
Irons--2
Wellston--5

In addition, there are over 40 county, municipal, or township campgrounds in western Michigan.

FISHERY RESOURCES

Generally, Lake Michigan waters are either shallow or deep. There is little in between. Patterns of fish distribution in Lake Michigan evolved largely as a result of this condition. Following is a list of the types of fish found in Michigan waters and in Lake Michigan:

Lake trout--present in a few inland lakes, greatly reduced in Lake Michigan due to sea lamprey predations.

Muskellunge--two strains are present: the northern muskellunge occurs in northern inland lakes; the Great Lakes muskellunge is present only in the Great Lakes and a few inland lakes connected to the Great Lakes.

Northern pike--abundant and statewide in distribution in all types of lakes and ponds and in quiet waters of large streams; generally rare in Lake Michigan, except in bays and connecting waters.

Walleye--abundant in the Great Lakes and large inland lakes, mainly in large, clear lakes; widely distributed in Michigan.

Yellow perch--extremely abundant, present throughout the state, common in mouth of Lake Michigan tributary streams, provide excellent spring fishing from Lake Michigan piers.

Bluegill--widely distributed, abundant in many lakes of the lower peninsula and in a few lakes in the upper peninsula.

Largemouth bass--abundant in lakes throughout the lower peninsula and in some lakes of the upper peninsula, common in weedy bays and protected margins of Lake Michigan.

Brook trout--native to Michigan, abundant in many streams of the northern two-thirds of the state and common in a few streams in the southern one-third. Common in small lakes and ponds of the upper peninsula, widely introduced to all suitable waters throughout the state.

Brown trout--most commonly found in streams of northern half of lower peninsula, rare in inland lakes and Lake Michigan.

Rainbow trout--most commonly found in northern parts of Lake Michigan, with spawning runs entering the larger rivers, especially those north of Muskegon. Adults maturing in Lake Michigan are referred to as steelheads because of their similarity to the Pacific Coast steelhead. They are regularly planted in many suitable lakes and streams throughout the state.

Not included in this list is the coho salmon recently planted in Lake Michigan. It may be one of the most exciting additions to fishing resources in a long time. Sport fishermen and commercial fisheries are enthusiastic about it.

Seasonal runs of some species, including smelt, channel catfish, walleye and smallmouth bass move from Lake Michigan into tributary streams and provide good fishing. Movement into the tributary streams is dependent largely upon water quality in the streams.

Many fishing shacks built on stilts are located on the St. Joseph River at Berrien Springs, fifteen miles upstream from Benton Harbor. The shacks are unused other than during the spring fishing runs when minnow seines are suspended from poles and used for dipping suckers and smelt. Water quality is good in this section of the St. Joseph River and is not a limiting factor to fish production or movement.

Perch fishing from piers on either shore of Lake Michigan is probably the most important type of sport fishing in the basin. During the perch runs, thousands of fishermen line the piers.

Smelt Waters

These are the best smelt waters in the Lake Michigan Basin.

1. Lake Michigan.
2. All streams feeding into Lake Michigan and its connecting waters in Menominee County.
3. All streams feeding into Lake Michigan for a distance of 1 1/2 miles from the mouth in Allegan, Berrien, Ottawa, and VanBuren Counties.
4. All streams feeding into Lake Michigan and its connecting waters for a distance of 1,500 feet from the mouth in Emmet, Mackinac, and Schoolcraft Counties.

Additional counties where smelt is found are Antrim, Benzie, Charlevoix, Delta, Emmet, Grand Traverse, Leelanau, Manistee, Muskegon, and Oceana.

State Fish Hatheries

Benton Harbor, Berrien County
Harrietta, Wexford County
Oden, Emmet County
Paris, Mecosta County
Thompson, Schoolcraft County
Wolf Lake, VanBuren County

Trout Rearing Stations

Baldwin, Lake County
Bear Creek, Manistee County
E. Br. Fox River, Schoolcraft County
Platte River, Benzie County

Lakes and Ponds Planted with Trout in Lake Michigan Basin

County	Number of Lakes and Ponds
Allegan	4
Antrim	6
Muskegon	2
Mecosta	2
Barry	4
Benzie	3
Branch	3
Calhoun	2
Cass	8
Charlevoix	5
Newaygo	5
Osceola	5
Delta	6
Dickinson	2
Grand Traverse	9
St. Joseph	4
Kalamazoo	6
Kalkaska	9
Kent	3
Lake	5
Schoolcraft	11
VanBuren	4
Leelanau	9
Manistee	2
Wexford	3

WILDLIFE

The shoreline counties and the adjacent and limited shoal waters are the areas of principal importance to wildlife in the Michigan portion of the Lake Michigan Basin.

The forest region of Lake Michigan's shore supports a wildlife community much different from the community of farm game species in the southern area. The forest and often untouched area of the upper peninsula of Michigan in the Lake Michigan Basin contains the following wildlife:

1. ruffed grouse (plentiful)
2. sharp-tailed grouse
3. prairie chicken (few)
4. cottontail rabbit (reduced)
5. snowshoe hare
6. fox squirrel
7. gray squirrel
8. pine and red squirrel
9. deer (many)
10. black bear
11. porcupine
12. bobcat
13. coyote

Waterfowl in the area include black ducks, hooded and American mergansers, diving ducks, and Canadian geese.

Escanaba is the best waterfowl area in Lake Michigan. Many pintails are found here.

Along the northern shoreline of the lower peninsula there are less game and fur animals. Two things have contributed to this, man and his cities. Several large inland lakes, Charlevoix, Torch, and Elk, lie within a mile of Lake Michigan and offer refuge for migrating ducks. Grand Traverse Bay has a bird rare for this area, the mute swan. There are some 150 birds now. Some of the birds migrate but many remain throughout the winter on the tributary waters. This is a wild population of mute swans and is very rare in this hemisphere.

The elk is another species of special interest in this area. The elk herd does not extend to the shores of Lake Michigan but is found in parts of Emmet, Charlevoix, and Otsego Counties. There is careful management of the herd because over population could cause problems because of the closeness of the herd to the cherry and apple orchard areas.

The region from the Sleeping Bear Dunes south is referred to as the "fruit belt" area of Lake Michigan. Farm game species predominate in the "fruit belt" area, include pheasants, fox, squirrel, cottontail, and woodcock.

Allegan State Forest has a high population of deer, ruffed grouse, and an established flock of wild turkeys.

Muskegon marks the southern boundary which separates ruffed grouse in the north and pheasants to the south.

The Betsie River near Frankfort, the Manistee River near Manistee, the Pere Marquette River near Ludington, the Pentwater near Pentwater, Muskegon River near Muskegon, the Grand River near Grand Haven and several of the small tributaries have extensive marshlands near their mouths. These areas are important producers of waterfowl and fur animals. The principle species are mallard, blue-winged teal, wood duck, and muskrat.

Many of these wetland areas lie almost within the city boundaries. Most of these areas are being acquired by the Michigan Department of Conservation, Because these marshlands are found so close to the industrialized areas, pollution of the streams is causing a marked decrease in the wildlife.

VanBuren and Berrien Counties provide wetlands for ducks and muskrats. Many of the islands in Lake Michigan are nesting places for gulls and terns.

A wildlife inventory is not complete unless the waterfowl adapted to deep water is included. Often these birds occur in large numbers far out on Lake Michigan. Some are old squaw, white-winged scoter, lesser scaup, red-breasted merganser, red-throated loon, American merganser, Holboell's grebe, horned grebe, common loon, and American scoter.

Public Wildlife Areas, Michigan Part of the Lake Michigan Basin

	Name	Management Agency	Acres Owned	Major Interest*
1.	Fenniville State Game Area	M.D.C.**	3,450	W, UG
2.	Swan Creek Wildlife Experimental Station	"	6,875	W
3.	Grand Haven State Game Area	"	675	W
4.	Muskegon State Game Area	"	5,120	W
5.	Pentwater River State Game Area	"	513	W, UG
6.	Pere Marquette State Game Area	"	33	W, UG
7.	Manistee River State Game Area	"	3,575	W
8.	Betsie River State Game Area	"	650	W
9.	Grass Lake Wildlife Flooding Project	"	482	W
10.	Headquarters Lake Wildlife Flooding Project	"	182	W
11.	Petobego State Game Area	"	442	W
12.	O'Neal Lake Wildlife Flooding Project	"	130	W
13.	French Farm Lake Wildlife Flooding Project	"	802	W
14.	Little Beaver Island State Game Area	"	9,114	D, RG
15.	Portage Marshes	"	Lake only	W
16.	Hayward Lake Wildlife Flooding Project	"	1,800	W
17.	Michigan Islands Refuge	U.S.D.I.--BSFW***	5	G, T
18.	Seney National Wildlife Refuge	U.S.D.I.--BSFW	95,530	W

* W - waterfowl
UG - upland game
D - deer
T - tern
G - gulls
RG - ruffed grouse

** Michigan Department of Conservation

*** United States Department of the Interior, Bureau of Sport Fisheries and Wildlife

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RECREATION, FISH, AND WILDLIFE

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LEAGUE OF WOMEN VOTERS OF WISCONSIN

League of Women Votors of Wisconsin
433 West Washington Avenue
Madison, Wisconsin 53703

STATEMENT TO THE FEDERAL-STATE ENFORCEMENT CONFERENCE ON POLLUTION IN LAKE MICHIGAN AND ITS TRIBUTARY BASIN

BY THE

LEAGUE OF WOMEN VOTERS OF WISCONSIN

JANUARY 1968

Along with many other citizens those of us in the League of Women Voters of Wisconsin have long felt ourselves to be residents of a "favored" State. We have been blessed by beautiful countryside, rich growing lands, timber, rivers and lakes, mineral resources, four sometimes two distinct seasons, a progressive, forward-thinking people, and we are bounded by one side by the great Mississippi and on the other by Lake Michigan. It is only natural that we should have a deep interest in water resources and that the League of Women Voters has been concerned with the various ramifications of our water resources for many years.

LEAGUE OF WOMEN VOTERS OF WISCONSIN

In large part in Wisconsin the damage done to our rivers and lakes--and it has been considerable--has been done through neglect and ignorance. This, at least, can be said of the situation until the last decade or so. Recently we have watched and abetted a sweeping flood of public education on pollution now existing and on the irreversibility of some of the damage.

Looking at Lake Michigan, we see that Wisconsin still has some municipalities without sewage treatment plants, some without secondary treatment, many with combined sanitary-storm sewers and, of course, thousands of septic tanks operating at less than top efficiency. In most of eastern Wisconsin the drainage is to tributaries leading to Lake Michigan. As a dairy State we still have many food products plants operating with insufficient treatment of wastes before being released to the stream. We have evidences of over-fertilization and siltation from farm land runoff. We have some problems with chemical contamination of rivers with soluble and insoluble materials. And we

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have massive evidence of insufficiently treated waste from pulp and paper mills and other factories along our most industrialized rivers. Now we are seeing the results of our carelessness in the destruction of the shoreline and pollution of the waters of Lake Michigan.

Lest we judge ourselves too harshly we have also been blessed with leaders who have informed themselves of the technical knowledge available and proceeded to attempt correction of the problems. Our recently organized Department of Natural Resources, the hearings to adopt intrastate water standards, the recent Pollution Source Surveys made in our most urbanized areas, and the appropriation of State funds to match Federal construction grants for pollution abatement are all examples of steps taken in the right direction.

In the past few years there has also been effort on the part of some industries to reduce the amount of waste released to the stream. Unfortunately we are growing in population and industry faster than we are adding treatment plants and "savealls." In their conclusions the investigators for the Wisconsin portion of the Fox (Illinois) River Drainage Basin say that "further degradation of water quality can result unless pollution abatement steps at least keep pace with the population and industrial growths." In the conclusions drawn for Wisconsin's Lower Fox River Pollution Survey it is stated: "The major industries have recovery facilities for strong wastes and by the spring of 1968 it is anticipated that all municipal sewage treatment plants within the basin will have provisions for secondary treatment." None the less, they add that some municipalities are in need of improved facilities and industry must reduce its pollutional load to alleviate undesirable conditions and that substantial improvements are needed to meet the proposed water quality standards.

Navigation pollution is an area problem. Two local Leagues situated on Lake Michigan interested themselves in promoting pollution abatement for ships more or less permanently in harbor. One League spent many woman hours over several years before holding tanks were installed in a Coast Guard ship. Another found it relatively easy to interest ship personnel in connecting the ship to municipal sewers. Now the first League feels a definite attitude of foot-dragging and perhaps only token compliance in the design, installation and prospective use of these facilities by Coast Guard authorities and personnel. Why should a State not require--and be able to require--the same degree of pollution control from Federal installations that the State requires from industries and municipalities?

One of our most important problems is in accelerated enforcement, although we have seen gains in this field too. During the month of October 1967 alone, Wisconsin announced satisfactory compliance in 22 water pollution abatement orders. Our gorwth is rapid and pollution abatement must gain on growth to reduce the problems existing today, as well as control future waste disposal. Enforcement is a double-edged cost: it costs industries and municipalities money to reduce pollution load to the stream, and it costs money for agencies to monitor conditions and use democratic procedures necessary to gain compliance. Municipalities have some recourse to Federal funds under the Clean Water Restoration Act of 1965 and in our State some matching funds. Nationally the League believes that the costs of industrial pollution abatement are the responsibility of the polluter, but acknowledges that some Federal help should be made available because of the urgency of the problem and the high costs involved. However, duration and scope of assistance should be limited and strict enforcement of antipollution measures should accompany financial assistance.

We believe that there has been improvement as well in coordination between States, but, as within our State, much more is possible. And now the League is interested in rounding out the forward thrust with coordinated planning and effort on a regional or basin concept. The League of Women Voters of Wisconsin views the Enforcement Conference not as a panacea but as another vehicle toward improved coordination and sounder planning in water resource development.

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MRS. CLUSEN: We think it is significant that the Leagues of Women Voters in these four States have chosen to work jointly in their efforts to improve the condition of Lake Michigan. We think it is even more important that these four States approach the problems of Lake Michigan in the same spirit of joint endeavor.

I am going to skip a considerable portion of this. We merely want to say that we want to use this opportunity to urge both the Federal Government and the States to look at Lake Michigan as a whole, to see beyond the immediate crisis and consider such other problems as navigation, water supply, water use and re-use if this seems properly within the scope of this Conference. We are encouraged by the calling of the Conference and by the fact that the four Attorneys General have agreed to compile and exchange lists of known polluters.

We have some recommendations which

we would like to express, among them the fact that we believe that a uniform plan for the enforcement of interstate water quality standards should be established and we think that this necessarily involves coordinating the standards among the four States, uniform enforcement procedures, Federal surveillance and testing of water with regular reports to FWPCA and the States involved. We hope that the Federal Government and the States look at Lake Michigan as an entity regardless of the problem they are discussing.

We hope that a timetable will be established which will provide for consistent planned advances in pollution abatement.

We recommend that enforcement of the timetable and the standards be strict and action upon the recalcitrant polluter speedy.

We recommend that coordinated research programs among the States be encouraged in order to facilitate feasible economical solutions and to prevent duplication of effort and expense.

These recommendations are based upon the results of a study which is currently underway by the four State Leagues. We hope the Conferees will want to read the detailed statements which have been submitted to them. I would just like to quote very briefly from these four statements so that you will know how very concerned the League of Women Voters is about the situation.

For instance, the League of Women Voters of Indiana in commenting on the Jones subcommittee hearings held in 1963 says:

"In the four years since we made our statement to the Jones Committee, the conditions in Lake Michigan have not improved, not even remained as they were then, in fact have become much worse."

The Indiana League goes on to say that Indiana schedule for compliance on industrial criteria in the Lake Michigan area proved to be a year and a half later than the one agreed upon by the Conferees of the 1965 two-State Conference.

The Illinois League points up the need for a look at the total picture by saying:

"The elusive sources of this increased

LEAGUE OF WOMEN VOTERS OF UNITED STATES

pollution, in spite of a two-year effort to abate it in the southern end of the lake, calls for a wider study of the entire lake."

They say:

"We find that lack of information on the true sources of pollution entering our sector of Lake Michigan sometimes leads to public unwillingness to tackle local problems."

The Michigan League has completed its section of the Lake Michigan study which the League is doing, and their findings are attached to our statement. This is the blue brochure which you have. At one point they say:

"The League of Women Voters of Michigan is concerned about the lack of coordination of agencies involved in the Lake Michigan Basin. There are five U. S. Coast Guard stations in Michigan which are discharging raw sewage into the lake, two facilities of the Corps of Engineers, and a National fish and wildlife station discharging wastes into Lake Michigan."

The statement of the League of Women Voters of Wisconsin includes these sentences:

LEAGUE OF WOMEN VOTERS OF UNITED STATES

"We still have some municipalities without sewage treatment plants, some without secondary treatment, many with combined sanitary-storm sewers and, of course, thousands of septic tanks operating at less than top efficiency. Now we are seeing the results of our carelessness in the destruction of the shoreline and pollution of the waters of Lake Michigan."

It seems to us in essence that these statements point up the finding that no State is blameless as a contributor to the pollution of Lake Michigan. No State, however, is apathetic or unconcerned either. As League members and as citizens of the Basin, we believe that the time for pointing an accusatory finger at any one State, industry or local community is past. What is needed is a sincere, earnest, forthright attempt to assess where we are now in controlling the water quality, what things we can do better in this four-State area by working together on the State level, what kind of Federal assistance can be most effective in helping us to achieve cleaner water in Lake Michigan.

In conclusion, I would simply like to say that in working to accomplish this objective that the League of Women Voters in these four States is prepared to be of any assistance which it can in helping citizens to understand their necessary role, whether it is by State or local legislation, whether it involves bond issues, whether it means more taxation or whether it means more strict monitoring and enforcement.

We think that we are in a good position to attempt to influence public opinion and public support for these things and to help provide the climate of opinion and the spirit of unity and cooperation which must exist among governments and citizens in these four States if anything is to be accomplished.

We also would like to suggest to you that because we are a national organization, because we operate on the State, local and, on water matters, even the basin level, that it is possible for us to try to evaluate the problems and the proposed solutions for Lake Michigan without worrying about Governmental boundaries and administrative restrictions. We are eager to be of whatever assistance we can to both Federal and State Conferees in implementing decisions and recommendations of this Conference.

In itself this Conference will not clean up Lake Michigan, but we hope it will point the way to preservation and wise use of this vital asset.

Thank you for your time, gentlemen.

(Applause.)

MR. STEIN: Thank you, Mrs. Clusen.

(Applause.)

MR. STEIN: Any questions or comments?

MR. HOLMER: Mr. Chairman.

MR. STEIN: Yes.

MR. HOLMER: I would like to ask Mrs. Clusen a question to which I think I know the answer.

First of all, I would like to commend her on the brevity and the incisiveness of her comments.

Beyond that, the League has been in this business now for some little time. Am

I on sound ground to assume that the League recognizes that this is a program of long duration and that we can count on their support for as long as it takes?

MRS. CLUSEN: I think I can safely say that we have been in this earlier than most, but later than a few, and that we are in it for the long haul for whatever it takes, yes.

MR. STEIN: Are there any other comments or questions?

I would just like to call one point to your attention. I only do this because it is the League and a well-thought-out statement.

There may be some factual points here which may be clarified later on, particularly on what the Indiana program is doing in the case of industry.

But you talked about a plan for the four States, and one of your points was uniform enforcement procedures. This intrigues me a little because the enforcement procedures in the States are slightly different. And while we have dealt with many of these

States, all four States on the enforcement procedures, they all work it slightly differently. We have had satisfactory results with the four States in their enforcement procedures. We have never recommended in the suggested State Water Pollution Control action, revised, that every State has to have a uniform enforcement procedure as long as they get the job really done.

What is the virtue of having a uniform enforcement procedure?

The reason I raise this is because if there is no real purpose, you might be spending a lot of energy achieving something which really doesn't come up with an appreciable result.

MRS. CLUSEN: I would be tempted to agree with you, Mr. Stein. I don't think that we are committed to this idea. I think the point probably that we are trying to make is that perhaps in the time limitation set by various State procedures that a lag might develop. We are more concerned with operating somewhat within the same framework and timetable that we are.

And may I say in regard to the specific statements that I think you will find them more fully explained in the State statements. I was pulling this out rather hurriedly. And I might also say that because of the League reputation for accuracy that I did ask each of these State Leagues to check their statements with their State agencies so this should reflect the situation as it really exists.

MR. STEIN: I think we are very lucky in this area. Again, we have had experience with all four States. In my opinion--I think I have been in this field a long time and have paid particular attention to the enforcement aspects of the State laws--all these States have enforcement procedures and enforcement policies which will enable them to take appropriate State action to meet any reasonable deadline. This has never been a problem, as far as I can see, in these four States.

MRS. CLUSEN: We are very glad to know that.

MR. STEIN: We have a letter I would just like to introduce into the record from the Izaak Walton League of America, Calumet Region Chapter, by John Chura, President, which will be introduced into the record. This letter is addressed to Secretary Udall, dated January 24, 1968.

IZAAK WALTON LEAGUE OF AMERICA, INC.
Defender of Woods, Waters and Wildlife
CALUMET REGION CHAPTER
14736 Beachview Terrace
Dolton, Illinois

January 24, 1968

The Honorable S. Udall, Secretary of the Interior
United States Department of the Interior
Office of the Secretary
Washington, D. C. 20240

Dear Secretary Udall:

The Calumet Region Chapter, Dolton, Illinois, of the Izaak Walton League of America, sharing the environmental objectives of the State and the Department of Interior for Lake Michigan and indeed all of our country's waters, will recommend adoption of the following resolution to both the Illinois State Division and National Conventions of the Izaak Walton League of America.

WHEREAS: The necessity for enforcement of water pollution control is self-evident, and Federal laws since 1956 and State laws since June 30, 1967, have not been uniformly enforced, and now that water quality standards are established

IZAAK WALTON LEAGUE OF AMERICA

THEREFORE: Let it be resolved that the Izaak Walton League of America, through its membership, will initiate energetically and promptly court action to produce enforcement.

Passed as a recommendation to the Illinois State Division Convention and National Convention by the Board of Directors. Calumet Region Chapter, Dolton, Illinois, in special session on January 23,1968.

We would appreciate the transmittal be read into the record of the Lake Michigan Four-State Conference that is scheduled to commence January 31, 1968.

Sincerely yours,
Calumet Region Chapter, IWLA
(Signed)
John Chura, President

cc: Reg. H.W. Poston
Regional Dir. Dept. Interior
Mr. Vinton Bacon
Gen. Supt. Met. San. Dist.
Mr. Clarence W. Klassen
Technical Secty. Ill. State Water Brd.

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MR. POSTON: I also have a letter here from the United States Department of Agriculture, Mr. George S. James, Regional Forester, which I would like to introduce in the record. I will have copies made and distributed to the Conferees.

U. S. FOREST SERVICE

(Which said letter is as follows:)

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
EASTERN REGION
633 W. Wisconsin Ave., Milwaukee, Wisconsin 53203

In Reply Refer to
2500

January 19, 1968

Mr. H. W. Poston, Regional Director
Great Lakes Region, Federal Water
Pollution Control Administration
33 East Congress Parkway, Room 410
Chicago, Illinois 60605

Dear Mr. Poston:

Thank you for your invitation to present a statement at the Conference in the matter of pollution of Lake Michigan and its tributary basin on January 31, 1968.

A Forest Service statement for inclusion in the record of the conference is attached. We are vitally concerned with the quality of waters flowing into and from National forests, and in particular the effect of our management on this water quality.

As the focal point of the meeting will probably be the matter of industrial and municipal pollution towards the southern end of Lake Michigan, we will not request time for presenting this statement in person.

U. S. FOREST SERVICE

Sincerely yours,

(Signed) George S. James
Regional Forester

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STATEMENT BY GEORGE S. JAMES

REGIONAL FORESTER, EASTERN REGION

U. S. FOREST SERVICE, MILWAUKEE, WISCONSIN

For inclusion in the records of the Conference in the Matter of Pollution of Lake Michigan and its Tributary Basin, January 31, 1968

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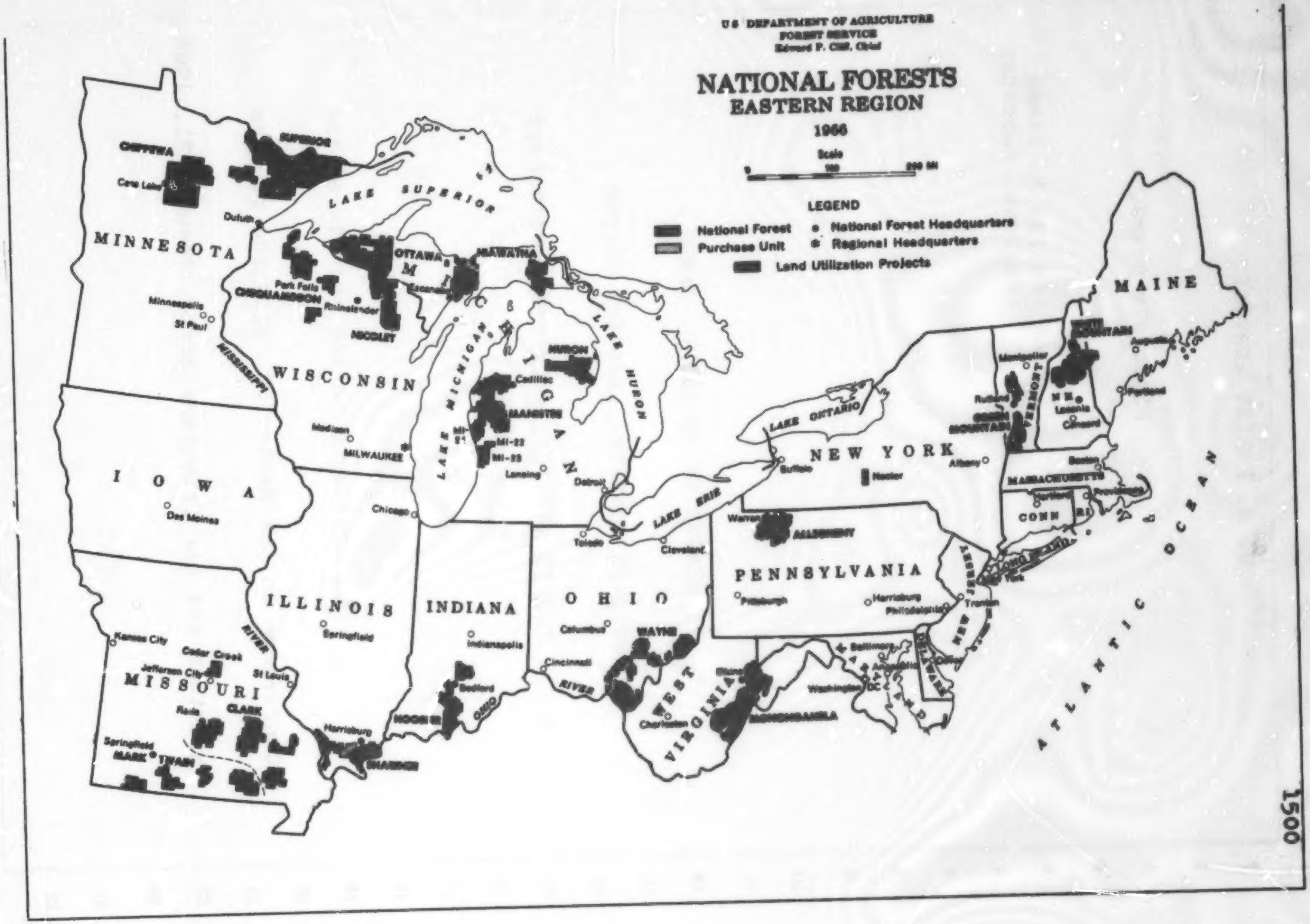
U S DEPARTMENT OF AGRICULTURE
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Land Utilization Projects
National Forest Headquarters
Regional Headquarters
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Cass Lake
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St Paul
MISSISSIPPI
LAKE SUPERIOR
WISCONSIN
Park Falls
CHEQUAMEGON
Rhinelander
NICOLET
OTTAWA
HIAWATHA
Escanaba
Madison
MILWAUKEE
MICHIGAN
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Concord
WHITE MOUNTAIN
MAINE
Augusta
Portland
ATLANTIC OCEAN
MISSOURI
Kansas City
Cedar Creek
Jefferson City
St Louis
Rolla
CLARK
Springfield
MARK TWAIN
RIVER

The National Forest System

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE — EASTERN REGION
REGIONAL HEADQUARTERS
633 W. Wisconsin Ave., Milwaukee, Wisconsin 53203

FIELD OFFICES

ILLINOIS

Shawnee National Forest
Harrisburg Nat'l. Bank Bldg.
Harrisburg, Ill. 62946

Ranger Districts and Headquarters

Elizabethtown	Elizabethtown, Ill.
Jonesboro	Jonesboro, Ill.
Murphysboro	Murphysboro, Ill.
Vienna	Vienna, Ill.

INDIANA-OHIO

Wayne-Hoosier National Forests
Stone City Nat'l. Bank Bldg.
Bedford, Indiana 47421

Brownstown	Brownstown, Ind.
Tell City	Tell City, Ind.
Athens	Athens, Ohio
Ironton	Ironton, Ohio

MICHIGAN

Hiawatha National Forest, P.O. Bldg.
Escanaba, Mich. 49829

Manistique	Manistique, Mich.
Munising	Munising, Mich.
Rapid River	Rapid River, Mich.
St. Ignace	St. Ignace, Mich.
Sault Ste. Marie	Sault Ste. Marie, Mich.

Huron-Manistee National Forests
Cadillac, Michigan 49601

Baldwin	Baldwin, Mich.
Cadillac	Cadillac, Mich.
Harrisville	Harrisville, Mich.
Manistee	Manistee, Mich.
Mio	Mio, Michigan
Tawas	East Tawas, Mich.
White Cloud	White Cloud, Mich.

Ottawa National Forest
Ironwood, Michigan 49938

Bergland	Bergland, Mich.
Bessemer	Bessemer, Mich.
Iron River	Iron River, Mich.
Kenton	Kenton, Mich.
Ontonagon	Ontonagon, Mich.
Watersmeet	Watersmeet, Mich.

MINNESOTA

Chippewa National Forest
Cass Lake, Minnesota 56633

Bena	Bena, Minn.
Blackduck	Blackduck, Minn.
Cass Lake	Cass Lake, Minn.
Cut Foot Sioux	Deer River, Minn.
Dora Lake	Northome, Minn.
Marcell	Marcell, Minn.
Remer	Remer, Minn.
Walker	Walker, Minn.

Superior National Forest, P.O. Bldg.
Duluth, Minnesota 55801

Aurora	Aurora, Minn.
Gunflint	Grand Marais, Minn.
Halfway	Ely, Minn.
Isabella	Isabella, Minn.
Kawishiwi	Ely, Minn.
LaCroix	Cook, Minn.
Tofte	Tofte, Minn.
Two Harbors	Two Harbors, Minn.
Virginia	Virginia, Minn.

MISSOURI

Clark National Forest, Rolla, Mo. 65401

Ranger Districts and Headquarters

Centerville	Centerville, Mo.
Fredericktown	Fredericktown, Mo.
Houston	Houston, Mo.
Poplar Bluff	Poplar Bluff, Mo.
Potosi	Potosi, Mo.
Rolla	Rolla, Mo.
Salem	Salem, Mo.
Cedar Creek LU Area	Fulton, Mo.

Mark Twain National Forest, 304 Wilhoit Bldg.,
Springfield, Missouri 65806

Ava	Ava, Mo.
Cassville	Cassville, Mo.
Doniphan	Doniphan, Mo.
Van Buren	Van Buren, Mo.
Willow Springs	Willow Springs, Mo.
Winona	Winona, Mo.

NEW HAMPSHIRE & MAINE

White Mountain National Forest, Federal Bldg.
719 Main St., Laconia, N.H. 03246

Ammonoosuc	Littleton, N.H.
Androscoggin	Gorham, N.H.
Evans Notch	Bethel, Maine
Pemigewasset	Plymouth, N.H.
Saco	Conway, N.H.

PENNSYLVANIA

Allegheny National Forest, P.O. Bldg.,
Warren, Pa., 16365

Bradford	Bradford, Pa.
Marienville	Marienville, Pa.
Ridgway	Ridgway, Pa.
Sheffield	Sheffield, Pa.

VERMONT & NEW YORK

Green Mountain National Forest,
Rutland, Vermont 05702

Central	Manchester, Vt.
Middlebury	Middlebury, Vt.
Rochester	Rochester, Vt.
Hector LU Area	Ithaca, N.Y.

WEST VIRGINIA

Monongahela National Forest, Dept. of Agric. Bldg.,
Sycamore St., Elkins, W.Va. 26241

Cheat	Parsons, W. Va.
Gauley	Richwood, W. Va.
Greenbrier	Bartow, W. Va.
Marlinton	Marlinton, W. Va.
Potomac	Petersburg, W. Va.
White Sulphur	White Sulphur Springs, W. Va.

WISCONSIN

Chequamegon National Forest, Federal Bldg.
Park Falls, Wisconsin 54552

Glidden	Glidden, Wis.
Hayward	Hayward, Wis.
Medford	Medford, Wis.
Park Falls	Park Falls, Wis.
Washburn	Washburn, Wis.

Nicolet National Forest, Merchants St. Bank Bldg.,
Rhinelander, Wis. 54501

Eagle River	Eagle River, Wis.
Florence	Florence, Wis.
Lakewood	Lakewood, Wis.
Laona	Laona, Wis.
Three Lakes	Three Lakes, Wis.

U. S. FOREST SERVICE

The Eastern Region of the U. S. Forest Service consists of 17 National Forests located in a 20-State area, spreading from Minnesota to Missouri to the northeastern States. There are four National Forests located in the Lake Michigan watershed.

The Manistee National Forest is located in lower Michigan. Tributary streams to Lake Michigan either originating on or flowing through the Manistee National Forest include the White, Pere Marquette, Big Sable, and part of the Manistee Rivers, as well as several smaller streams. The deep sandy soils in this area have a moderating effect on streamflow with resultant moderate peak flows and substantial low flows. There are three miles of Lake Michigan shoreline in Federal Government ownership administered as part of the Manistee National Forest.

The Hiawatha National Forest, consisting of two separate units located in upper Michigan, has about 20 miles of Lake Michigan shoreline in government ownership. The streams draining into Lake Michigan include the Pine, Carp, Brevort, Indian, White Fish, and Sturgeon Rivers. The

Hiawatha National Forest has extensive areas of wetlands as well as its forested lands. Soils are generally sandy with streamflows being moderately stable.

The Nicolet National Forest in northern Wisconsin is located inland some distance. The Forest includes headwaters of the Brule, Pine, and Popple Rivers (which flow into the Menominee), and the Peshtigo, Oconto, and Wolf Rivers. A small part of the Ottawa National Forest located in upper Michigan and adjacent to the Nicolet National Forest, also forms a part of the headwaters of the Menominee River.

There are approximately 3,300,000 acres within National Forest boundaries in the Lake Michigan watershed. Of this gross acreage, approximately 1,800,000 acres are in government ownership administered by the Forest Service.

The Organic Act of June 4, 1897, cites "securing favorable conditions of water flows" as a principal purpose of National Forests. The Weeks Act of March 1, 1911, further recommends for purchase such forested, cutover, or depleted lands within the watersheds of navigable streams, as may be necessary to the regulation of the flow of navigable streams.

Because those "favorable conditions of water flows" and "the regulation of the flow of navigable streams" include quantity and timing, in addition to quality, a great responsibility lies with the Forest Service in the use, management, and administration of these key lands.

To meet Forest Service responsibilities in the water resource field, there are established water resource objectives for all watersheds. These objectives are determined by examining the total water resource use and the related needs, both within National Forest boundaries and for areas downstream, and both for National Forest and non-National Forest purposes.

We consider all water uses including municipal, commercial and industrial, agricultural, recreational (include aesthetics), fish, and other aquatic life, wildlife, and forest activities, both present and future.

Based on water needs, if the conditions of water flows are satisfactory regarding the quality, quantity, and timing of flows, then water resource objectives include protection requirements to insure that the present satisfactory conditions are maintained. Other resource activities, such as recreation use, timber harvesting, and road building must be carried out in a manner which will prevent stream sedimentation and other pollution. In fiscal year 1967 there were 124 million board feet of timber cut within the Lake Michigan watershed under contract with commercial timber operators. Timber harvesting contracts contain clauses directed towards the prevention of stream sedimentation and other pollution. We believe that managed timber harvesting causes little, if any, sedimentation or other pollution.

There were about 26 miles of road constructed or reconstructed on National Forest lands in the Lake Michigan watershed in fiscal year 1967. Erosion control measures are included in the design and construction of Forest Service roads.

Other water quality protection requirements include the proper design of Forest Service sanitary systems to insure that the affected natural waters meet the standards set for the various uses of that water. Forest Service sanitary engineers, watershed scientists, soil scientists, and geologists are all involved to insure adequate design of sanitary systems. The Federal Water Pollution Control Administration further approves our sanitary system designs.

Of primary concern to us is the problem of excessive fertilization of surface waters. This problem is perhaps of more immediate concern to smaller inland lakes within the Lake Michigan Basin. Eutrophication of surface waters is accelerated by excessive use of fertilizers and the dumping of nutrients from sanitary systems into the waters. Various systems of sewage treatment may be safe from a health standpoint and yet be responsible for the addition of phosphates, nitrates, and other nutrients to surface waters to the point where the waters become aesthetically unpleasing with algae blooms and other weed growth. In extreme cases, the biotic balance and fisheries of the waters may be harmed. Developments with septic systems in very permeable soils as well as impermeable soils ringing small lakes can be responsible for accelerated eutrophication.

If there is a need to improve the quality, quantity or timing of the water resource appropriate improvement objectives are established. We may employ any reasonable action to meet these objectives. These land management prescriptions may include such things as the restoration of the eroding streambanks, the effective use of vegetation or engineering structures to regulate the quantity and timing of waterflows, or the proper redesign of faulty sanitary systems.

While the water resource is the prime factor in any land management decision, other resource uses of these lands are, and must be made. Land management prescriptions to meet water resource objectives must be in harmony with these other resource uses. This is in accordance with the multiple use principle set forth in the Multiple Use Sustained Yield Act of 1960. Multiple use is the management of all the lands so that the renewable surface resources of the National Forests are utilized in the combination that will best meet the needs of the American people.

U. S. FOREST SERVICE

In accepting our responsibilities, we have developed five Forest Service policies related to water quality.

1. Insure that return flows, particularly those associated with recreation and other domestic use, do not impair natural waters for the other purposes water is expected to serve.
2. Make certain that National Forest land management practices are conducted in a manner which will insure a quality of water yield suitable for its intended purposes.
3. Maintain a water quality satisfactory for other National Forest resource uses, such as fish habitat, and swimming and related uses whenever it is within the capability of the Forest Service to do so. All Forest Service swimming areas are now monitored to insure that they are safe for swimming.
4. Insure biologically safe, suitable

drinking water for use of the public. All wells are monitored and tested on a planned basis.

5. Modernize sanitary systems at existing Forest Service installations where necessary. An approved sanitary system at all new installations is a basic part of the installation plan.

Compliance with these guidelines is no simple task. About 40 percent of the gross area within National Forest boundaries in the Lake Michigan watershed is held in private ownership. We have no jurisdiction over these private lands. A large proportion of this private land is located along major streams or adjacent to lakes, constituting a potential pollution source over which the Forest Service has no control.

The most obvious way, then, to make a meaningful contribution to the water quality problem starts with cooperation with private landowners, industry, and the various Federal, State, and local government units. This need for cooperation is, of course, the reason for this Conference.

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One of our objectives is to cooperate with the various States in improving fisheries habitat. We are becoming increasingly involved in the anadromous fisheries program in the Great Lakes. Good quality waters are needed for salmon and trout fisheries. Water temperatures must be maintained within acceptable limits. Chemical pollutants must be held below certain limits. Siltation must also be maintained below certain acceptable limits to prevent the filling of spawning beds with sediments and the accompanying reduction of oxygen levels. Often what we do to control erosion on National Forest lands is negated by the erosion that is still taking place on other lands upstream.

Thus, we are not only concerned with the effect of our management on water quality. We are also concerned with the effect of the quality of waters beyond our control on our ability to provide needed services for the American people. For instance, we now have recreation areas with swimming facilities along Lake Michigan shores. We are planning additional recreational facilities of this type. The water quality of Lake Michigan will, in part, determine the enjoyment that the people will derive from these areas and the economic development of the surrounding area associated with these recreational facilities.

Compared to the total impact of man on water quality in Lake Michigan and its tributary waters, the National Forest influence water quality to a relatively small degree. Nevertheless, the Forest Service can and does contribute to the water quality of the Lake Michigan watershed. It is our sincere desire that our contributions to this very important aspect of our total environment are meaningful and correct. We will make every effort to insure that they are.

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(The following statements were also submitted for inclusion in the record as if read:)

REMARKS OF ROMAN H. KOENINGS
REGIONAL DIRECTOR, LAKE CENTRAL REGION
BUREAU OF OUTDOOR RECREATION
DEPARTMENT OF THE INTERIOR

BUREAU OF OUTDOOR RECREATION

AT THE LAKE MICHIGAN ENFORCEMENT CONFERENCE

JANUARY 31, 1968, IN CHICAGO, ILLINOIS

I am Roman H. Koenings, Regional Director of the Lake Central Region of the Bureau of Outdoor Recreation U. S. Department of the Interior. We are deeply concerned about the continued reduction of water quality and attending degradation of the environment in the Lake Michigan Basin. At stake are present and future opportunities for recreational use and, even more important, the livability of the basin for present and future generations.

Water for recreational purposes is becoming increasingly essential. The availability of more leisure time and increased use of that leisure time for outdoor recreational activities will place greater demand on our lakes and streams to satisfy these demands. The increase in leisure time associated with a general higher disposable income will provide the population of the States of Wisconsin, Michigan, Illinois, and Indiana, as well as their vacationing guests an opportunity to participate in outdoor recreation more frequently and for longer periods of time.

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The economics of outdoor recreation cannot be ignored. Both Michigan and Wisconsin report their tourist industry as over a billion dollars a year. As indicators, the basin contains about 80,000 summer homes, 200 private campgrounds, and 400 private group camps and many resorts. Add to these the supporting facilities and services from restaurants, motels and gasoline stations to sporting goods manufacturing and sales, and you have a whopping private investment in outdoor recreation in the basin.

The Bureau has conducted or is participating in several water resource studies involving all or portions of the Lake Michigan Basin. These include the International Joint Commission Great Lakes Water Levels Study, the Great Lakes Illinois River Water Quality Study, the Upper Mississippi River Basin Comprehensive Study, the Island Study in Wisconsin and Michigan, the Grand River Basin Study in Michigan and the St. Joseph River in Indiana and Michigan. Some of the more pertinent findings to date are:

1. The population of the four-State area was 24 1/2 million people in 1960 and is

expected to double by the year 2000. About a third of these people reside in the highly urbanized areas, including Milwaukee, Chicago, and Gary-Hammond-East Chicago.

2. The 625 Federal, State, and local public recreation areas in the Lake Michigan Basin have 88,300 acres developed for recreational use. On Lake Michigan, 1,300 miles are classed as recreational shoreline, including some of the finest beaches in the country. Much of this shoreline is privately controlled.

3. The existing areas are not meeting needs, and the demand for opportunities to participate in boating, swimming, water skiing, and fishing are expected to increase fourfold by the year 2000. To provide for these and other recreation needs, about 240,000 acres of intensively developed recreation land and 550,000 acres of extensively developed land will be required to meet demand in the year 2010.

This summary not only points up some of the outstanding recreational resources presently available in the Lake Michigan Basin but it also shows the pressing need for additional recreational opportunities. The availability of high quality water is a prime consideration in the planning and development of recreational facilities whether we use the water to boat on, swim in, or picnic and hike near. Water quality degradation not only threatens to eliminate or seriously limit existing developments, but it also precludes future or expanded developments at many desirable, strategically located sites.

Continued degradation of the water resources in the basin will place greater recreational use pressure on the few remaining acceptable water areas, particularly near urban areas.

Our 1965 study on the Lake Michigan Basin shows the extent of water quality influences on recreation. Areas where water quality has grossly or moderately impaired the opportunities for body contact water activities include the densely populated shore areas of Green Bay, Manitowoc, Milwaukee, Kenosha, Racine, Gary-Hammond-East Chicago, Benton Harbor, Holland, Grand Haven, and Escanaba. In addition, numerous tributary rivers are not suitable for water-based activities and contribute significantly to lakeshore problems. Some of the specific recreation facilities that have been or are in danger of being damaged by pollution include: Bay View Beach at Green Bay, Indiana Dunes State Park, Indiana Dunes National Lakeshore, Muskegon State Park, Warren Dunes State Park, Chicago metropolitan parks, and Milwaukee county parks.

Research is generally lacking to show exact correlations between recreational use and pollution. In some instances health hazards are much greater in waters that are aesthetically pleasing. Cases have been reported that swimming use remains high even when a beach is posted to the risk of infection. On the other hand, areas that have been defiled visually or that emit odors are considered unusable by the public even though bacterial contamination is a minor problem. In the cities, where open space and natural areas are at a premium, people will use whatever is available. I believe we would be disturbed if we knew the extent to which city children play in the polluted harbor and waterfront areas.

Despoiling aesthetic values of the lake are usually the result of uncontrolled pollution over a long period. While the buildup of bottom deposits does not directly impair recreational use, the subsequent dredging in harbors and offshore dumping have been responsible for fouling some of our heavily used beaches. Nutrification over a period of time has also created aesthetic problems caused by algae buildups which accumulate and decay on many beaches. Wastes from boats have been responsible for fouling harbors and beaches with oil, untreated sewage, and debris.

In most cases beach health hazards are closely associated with pollution sources in the vicinity of the recreation area. We believe the greatest initial benefits to recreation would come from the control of nearby sources of pollution. Solving the long term degradation of the lake, however, will require a major coordinated effort to control both shoreline and tributary stream pollution sources. It is as unrealistic to control pollution on half of the lake as it is to control shoreline sources without consideration of upstream problems.

There can be no question that outdoor recreation is one of the principal beneficiaries of pollution abatement programs. But outdoor recreation also is a contributor to pollution. Pleasure boats use the lakes as if they were oversized toilets; summer cottages and associated recreation areas often have inadequate sewage treatment facilities; and the American citizen is a notorious litterbug. As a matter of fact, from an esthetic standpoint, I sometimes wonder if littering isn't as serious as the many other types of environmental intrusions.

Boaters accustomed to dumping wastes overboard will have to be educated and convinced that it is in their best interest to acquire and use the equipment needed to treat these wastes for onshore discharge. New marinas should be required to have adequate facilities for receiving boat wastes and existing marinas should be required to provide such facilities within a reasonable time.

Communities must be sold on the need for local ordinances governing the disposal and treatment of wastes emanating from lake and riverside residential areas.

Littering is a national disease which

can be cured through education. And the most effective education is in the family where parents show by example that gum wrappers and beer cans belong in the trash can and not on the ground or in the water.

Closely allied with water quality are other environmental problems which set the tone of livability, particularly in our urban areas. In many cases the solution of these problems is interrelated to water quality. Social values are assuming greater importance in resource allocation and development and cannot be molded to fit a clean-cut cost benefit analysis. The social revolution now in progress demands new thinking and new methods of solving problems. The tremendous costs of solving water and air pollution as an initial step to improving livability may be minor when compared to the social damage of pollution. Recreation opportunities will be increased substantially by a coordinated multi-stage pollution abatement program but the real beneficiaries of the program will be the people who live near and use the waters of the basin.

Thank you.

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BUREAU OF SPORT FISHERIES AND WILDLIFE
STATEMENT FOR THE
LAKE MICHIGAN WATER QUALITY CONFERENCE
CHICAGO, ILLINOIS - JANUARY 31, 1968

The sport fish and wildlife resources of Lake Michigan are of National importance. In 1960, about 19 million angler-days and 5 million hunter-days, valued at approximately $45 million (estimated by procedures described in Supplement No. 1 of Senate Document No. 97, 87th Congress, 2nd Session, titled "Evaluation Standards for Primary Outdoor Recreation Benefits") were spent within the lake's Basin. This use is continuing to increase. Within the next 50 years, fishing use probably will triple and hunting use, double for Lake Michigan.

In terms of numbers of fishermen, pier fishing for perch is probably the most important type of sport fishing in the lake. A 1964 investigation of fisherman-day use along the Chicago lakefront revealed that 1 million people fished this 30 miles of shoreline that year. Other species of importance to Lake Michigan sport fishermen include smallmouth and largemouth bass, walleyes, northern pike, trout, and salmon.

Important spawning runs of native and introduced trout occurring in Lake Michigan were seriously curtailed in the late 1950's because of sea lamprey depredations. They are now increasing and with the success of the lamprey control program and recent fish introductions it is hoped they will continue to. These increases are encouraging the States to take definite steps to increase present runs and to establish new spawning populations.

We are all aware of the tremendous success Michigan has had with its coho salmon introduction. When the spawning adults returned to their home streams this fall they provided a new and spectacular fishery. The 72,000 fishermen who took advantage of this new fishery left a distinct mark on the economy of the region. Available evidence indicates that this program can be expanded to include more of Lake Michigan. Fishing opportunities need not be limited to the mouths of Michigan streams.

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We are proud of the role we have played in the development of these fisheries. Under the terms of the Anadromous Fish Act of 1965 (P.L. 89-304) the Bureau has supplied over a million dollars to States bordering Lake Michigan on a cost-sharing basis ". . .for the conservation, development, and enhancement of the Nation's anadromous fish. . ."

By nature of their reproductive requirements, fish that ascend streams to spawn are highly subject to pollution. Adults are subjected to the concentrated pollutants in the lower stream reaches. If these are sufficient to discourage or kill the adults, there can be no reproduction. If the adults are able to negotiate pollution barriers their offsprings, which are more delicate than the adults, must be able to move downstream through the polluted area to the lake. We are especially interested in the maintenance and enhancement of these fisheries. While we can provide material assistance to the States, this assistance is to no avail if runs of sport fishes have little chance of perpetuating themselves.

Future fishing and hunting opportunities in Lake Michigan and its tributaries would be almost unlimited if these renewable water resources were managed and intensively developed. The quantity and quality of the fish and wildlife resources of the Basin are, however, dependent on the quality of the water in tributary streams, connecting marshes, and in the lake.

With the exception of Milwaukee Harbor and some inshore and river-mouth areas, there is little evidence yet of general deterioration of water quality throughout most of Lake Michigan. This is not to say that Lake Michigan has not changed or is not changing. Concentrations of several major ions and total dissolved solids are increasing at a slow and constant rate. Without acceleration of this rate, significant detrimental fishery effects throughout most of the lake are not anticipated for many years. The possibility of a sudden acceleratory shift cannot be altogether discounted. Such a shift occurred in Lake Erie around 1910 and appears to be symptomatic of accelerated aging of that lake. Declines in many of the more valuable fisheries have been associated with this dramatic process.

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The relatively small changes in the water quality of Lake Michigan do not preclude the possibility of other drastic changes in the environment of considerable damaging consequence to fish and wildlife. Little is known of the possible accumulation of toxic substances such as pesticides, detergents, and other chemicals in the water, sediment, fish flesh, and important food organisms. Studies are being made to determine the extent of accumulation of toxic materials and their effect on fish and wildlife.

Many of the tributary streams are used extensively for waste disposal. This was and is a convenient method of disposal. Bottom conditions of many tributaries have been so severely degraded that only pollution-tolerant organisms can survive. Extensive mortality of fish has occurred, generally due to surges of pollutants or to lack of oxygen during periods of low stream flows. One of the most serious sources of organic pollution is attributable to the manufacture of pulp and paper.

We are concerned over the increasing dredging and spoil deposition activities pursued by private and commercial interests, rural

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communities, and urban centers bordering the Great Lakes shores. Valuable aquatic habitat is disrupted or destroyed, in addition to degradation of water quality in the vicinity of the work. The need for alternate dredge disposal sites, located and constructed so as to keep damages to our aquatic environment at a minimum, looms ever larger as a paramount problem facing all Federal, State, and local interests.

The Bureau of Sport Fisheries and Wildlife participates directly in the Great Lakes Fishery program by cooperating with the Great Lakes Fishery Commission. The Bureau has constructed three fish hatcheries to rear 4 million lake trout annually, 2 million of which are stocked in Lake Michigan. The annual cost of Lake Michigan fish stocking by the Bureau approximates $86 thousand. Assessment studies by the Bureau of Commercial Fisheries indicate that this program is highly successful. There is indication that a natural brood stock of lake trout will be established from these plants, thus eliminating most of the need for additional plantings past 1978. The quality of the Lake Michigan water and

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quantity of spawning areas will have a direct bearing on the ability of the breeding stocks to maintain themselves. Further adverse changes in water quality will require extension of the stocking period or eliminate the program entirely. If pollution of the lake is arrested and fishing pressures reach projected levels, our hatchery capacity can be used to produce other needed sport fishes.

Lake Michigan is not a primary producer of waterfowl, but it is important during migration periods and winters a large number of sea and diving ducks. Oil pollution is one of the more important causes of non-hunting mortality of ducks using Great Lakes waters. The bird's insulating plumage becomes matted, allowing cold water and air to reach the skin. Body heat is lost faster than it can be generated, and in cold weather the birds soon perish. For a creature that must maintain a body temperature of 102° F., this becomes a real problem. As many as 12,000 "oiled" ducks have been lost from just one such pollution case.

Other forms of pollution also influence

ducks either directly or indirectly. Some chemical pollutants are toxic when ingested, while others such as silt and sewage destroy or degrade the environment.

Wise use of our fish and wildlife resources is imperative if the greatest recreational value is to be received and the resources perpetuated. Pollution losses are serious and can be avoided. Purposeful environmental contamination is gradually being eliminated, but "accidental" discharge of pollutants, particularly oils, is the result of inadequate laws, less than vigorous enforcement of existing laws, and apathy on the part of industrial and shipping interests.

It is the position of the Bureau that an ultimate goal of the clean waters program of the Nation should be to maintain or achieve such quality in every stream, lake, estuary, bay, or other water as will support the full potential of the water for production and human use of aquatic life and water-dependent wildlife resources. Since many waters now have water qualities higher than those set by States or recommended by the Government, every effort should be made to protect these high quality waters where they exist and decrease pollution loads in all other waters. It should be the primary purpose of all individuals, communities, and State and Federal agencies having an interest in Lake Michigan to continue to develop a mutual comprehensive program for reducing the pollution of this interstate body of water. To this end, the Bureau of Sport Fisheries and Wildlife will work closely with any group or agency having an interest in the improvement and maintenance of this valuable resource.

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STATEMENT OF
GENERAL FEDERATION OF WOMEN'S CLUBS
SUBMITTED BY MRS. ALVA APPLEBY
CHAIRMAN, POLLUTION DIVISION

Secretary Udall, Governor Kerner and Conservationists:

As a spokesman for the General Federation of Women's Clubs through the request of Mrs. Alva Appleby of Skowhegan, Maine, Pollution Chairman of the General Federation, I somehow hope to voice the thoughts and expectations of club women throughout the United States.

Women in general, but particularly club women have become infinitely more sophisticated conservationwise in the past decade. In my own State of Wisconsin, I as State Conservation Chairman, try to inform and direct conservation chairmen in each of 10 districts, who in turn channel information to the 322 clubs and approximately 22,000 club women in the State. This pattern is carried out in all States, and club women are usually well informed individuals who have a deep and genuine concern for the quality of their environment.

Of all of the interlocking facets of Federation conservation activities, however, perhaps the area which arouses the greatest response is the division of water pollution. Water, whether it be streams, rivers, small lakes, or our Great Lakes, arouses an emotional drive in women that cries out for action. Women throughout the Nation have striven to be informed, to be articulate, and to present concerted action because they want clean water. Women are concerned about aesthetic values as well as moral values, and the continued and worsening degradation of Lake Michigan offers a hideous challenge to both.

I think that it is pretty well understood that the deterioration of this vast body of water must be reversed soon if Lake Michigan is to be saved at all. This Conference therefore seems to be the first bright spot on the horizon, because it is the first true attempt to deal with the problem as a whole. No matter how concerned each of the four bordering States may be about pollution in Lake Michigan, it seems improbable that States working alone can cope with a situation of this magnitude, and the General Federation commends the calling of this very much needed Conference. Surely all of the work and energy and knowledge brought together in this united effort will produce results that will have far reaching consequences.

There are three points that I would like to briefly touch on in this statement. I do not pretend to be a specialist, but while I may speak in generalities rather than specifics, these are the areas of concern that trouble thousands of women who are interested in the outcome of this

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Conference on Lake Michigan.

The first question concerns the Water Quality Standards of the State of Wisconsin which have been approved by the Federal Government. Wisconsin club women, especially those who attended the Green Bay hearings, know that the Fox, the Oconto and the Peshtigo Rivers have contributed to the almost total degradation of the lower part of Green Bay, which is a part of Lake Michigan. Under the minimum standards for water quality, a low classification for these rivers had been proposed, but it is expected that these standards will be upgraded as soon as possible. We do not wish to, in effect, preserve the status quo by legalizing existing sources of pollution, so we would ask--do we already need to upgrade water quality standards which in some instances would tolerate existing conditions? The Wisconsin Water Quality Standards are good, but we expect better.

The second point concerns the need for a "crash program" to save Lake Michigan. Although this is an over used cliche it does invoke the images of immediacy and money, and I believe that both are necessary. The General Federation of

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Women's Clubs believes that women understand that there is a price associated with this, and that women are willing to pay that price because there is a sense of shame involved in allowing a great national asset to die. Somehow there is no glory in putting a man on the moon when a great civilization fouls and despoils its waters, and perhaps our claim to greatness will stand or fall on our determination to preserve and restore our own environment for the benefit of all of the people.

The third point I would bring up is the urgent need to prevent new sources of pollution. There can be no hope of ever cleaning up the lake if there is an ever mounting backlog of contamination, so club women ask specifically for the prevention of new threats to the lake. One such danger is that of thermal pollution from the nuclear power plants already under construction. Surely cooling towers or other devices,which have already been proved technically feasible, should be made mandatory.

The other danger comes from new industries which will be built. The General Federation of Women's Clubs believes that tertiary treatment of wastes to remove the phosphates will be required to clean up Lake Michigan, and that through a licensing process new industries would have to conform to acceptable means of waste disposal which would include tertiary treatment. It would seem incredible, if after a Conference such as this, any other course could be followed.

In connection with this additional treatment of wastes it might be added that we will still have the continuing problem of detergents that has plagued us for so long--detergents which contribute so much of the phosphates to our waters. Women are cognizant of the fact that not only tertiary treatment of waste disposal is necessary, but that there is also a detergent break-through to be solved.

In conclusion, I would like to say that club women from all over America are looking to this Conference with the highest hopes and expectations. The President of the Illinois Federation of Women's Clubs is here today and joins with me in wishing that from this meeting will come the united efforts and knowledge and determination that can save our Great Lakes and perhaps signal a better day for all of our inland waters.

Mrs. G. L. McCormick
State Conservation Chairman, WFWC
S37 W26861 Holiday Hill
Waukesha, Wisconsin 53186

Representing:

Mrs. Alva Appleby, Skowhegan, Maine
Chairman Pollution Division
General Federation of Women's Clubs

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MR. STEIN: Are there any other comments or questions?

(No response.)

MR. STEIN: In view of the lateness of the day--

MR. HOLMER: Mr. Chairman.

MR. STEIN: Yes.

MR. HOLMER: Before you get to the lateness of the day (laughter), this statement by the Forester will be introduced into the record. Will it be shared with the members of the Conference also?

MR. POSTON: Yes, I indicated the Conferees will get a copy of it shortly.

MR. HOLMER: Will we have an opportunity sometime along the way to have representatives of the Department of Agriculture here? I am not so much interested in the Foresters, although these are significant, as I am in some of the other areas that relate to our concern.

MR. STEIN: What is the situation on that? Perhaps, Mr. Cook--can you answer that question?

MR. COOK: We have a short report, if you want to take a few minutes.

MR. STEIN: No, no. He wants to question the representative of the Agriculture--

MR. COOK: No, there will be no representative of Agriculture here.

MR. STEIN: Haven't they been invited?

MR. COOK: They were invited. They had to leave. They asked us to read the report if the opportunity arose.

MR. STEIN: In view of the interest of Mr. Holmer, we will try to get back the agricultural interests here, because questions are fairly obvious in the area that he wants to talk about.

MR. COOK: This is a report I think you

should hear.

MR. STEIN: Let's try to get those people here when we reconvene the Conference, because I do think we need them in person.

Are there any other comments or questions?

(No response.)

MR. STEIN: We can get back to the lateness of the day.

(Laughter.)

MR. STEIN: We are thinking of recessing a little early to let the people who are lucky enough to get home over the weekend to make their plane and train connections, but here is the way we look at the schedule.

Next week, same place, 9:30. On Monday we anticipate that we will complete the Illinois and Federal statements.

On Tuesday, Michigan and Indiana.

On Wednesday, Wisconsin.

Of course, if a Governor or a Mayor or a Congressman or a Senator comes in, we will make the necessary adjustments to meet his busy schedule.

MR. POOLE: Mr. Chairman.

MR. STEIN: Yes.

MR. POOLE: You advised me at noon we would complete Indiana and Illinois Monday. I have some people that are working people and I have told them to come on Monday.

MR.STEIN: Yes, I stand corrected. Illinois and Indiana on Monday.

Michigan will be on Tuesday and Wisconsin on Wednesday.

We also have the Federal Recommendations and Conclusions, and we will try to work those in on Monday or Tuesday when we get a chance.

Am I correct now? Will the Conferees bear with me on this?

Monday,Illinois and Indiana, Tuesday, Michigan, Wednesday, Wisconsin? Is that correct?

(All Conferees answered in the affirmative.)

MR. STEIN: All right, we will stand recessed until 9:30 Monday.

(Whereupon, at 3:40 p.m., an adjournment was taken until 9:30 a.m., Monday, February 5, 1968.)

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